

Los Angeles County Metropolitan Transportation Authority

Westside Subway Extension Project

C1056 – La Cienega

Advanced Utility Relocations

Geotechnical Report – Proposed SCE Ductbank

February 26, 2014

Amendment 1



Metro®



U.S. Department
of Transportation
Federal Transit
Administration

MEMO

To **Ms. Amanda Elioff, P.E.**
Parsons Brinckerhoff

Date **February 26, 2014**

Project No. **4953-11-1423**

Subject **Geotechnical Report - SCE Conduit at Wilshire/La Cienega Station**
Westside Subway Extension, Los Angeles County, California

This geotechnical report has been prepared for the construction of the proposed Southern California Edison (SCE) utility ductbank, as part of the Advanced Preliminary Engineering (Adv. PE) phase of the Wilshire/Western to Wilshire/La Cienega portion (Section 1) of the proposed Westside Subway Extension project for the Los Angeles County Metropolitan Transportation Authority (Metro). The proposed ductbank will be installed to the west of the Wilshire/La Cienega Station.

This report is prepared based on the results of investigations performed by AMEC and AMEC's predecessor company, MACTEC, during the Advanced Conceptual Engineering (ACE), Preliminary Engineering (PE) and Advanced (Adv.) PE phases of the project (all referred to herein as current investigations).

The geotechnical parameters presented in this report reflect the design team's judgment of anticipated subsurface conditions and ground behavior based on the construction means and methods anticipated. The design data presented herein were established by considering available geologic and geotechnical data, together with past construction experience and anticipated construction methods in similar ground conditions. Development of the project design recommendations required interpretation of the data obtained from various sources, including: geologic maps; hollow-stem auger, rotary, and core borings; geophysical surveys; and in-situ and laboratory tests, as well as the consideration of information from previous construction projects completed in similar geologic conditions. While actual conditions encountered in the field are expected to be within the range of conditions discussed herein, the locations where specific ground and groundwater conditions are encountered may vary from those described in this report. In addition to the specific conditions described herein, the ground behavior will also depend on the construction sequence and methods employed, as well as the Contractor's equipment and workmanship. The project design, therefore, assumes that the construction methods and level of workmanship will be consistent with those that can reasonably be expected from an experienced and qualified contractor.

Geotechnical Report – SCE Conduit at Wilshire/La Cienega Station
Westside Subway Extension
February 26, 2014

It is a pleasure to be of continuing professional service to you. Please call if you have any questions or if we can be of further assistance.

Sincerely,

AMEC Environment & Infrastructure, Inc.



Hari Ponnaboyina, P.E.
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for Martin B. Hudson, Ph.D., G.E.
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1.0 INTRODUCTION

This geotechnical report has been prepared for the construction of the proposed Southern California Edison (SCE) utility ductbank to the west of Wilshire/La Cienega Station. The ductbank will be installed with trenchless construction procedures as part of Section 1 of the proposed Westside Subway Extension (WSE) project for the Los Angeles County Metropolitan Transportation Authority (Metro). This report is one of the ten reports prepared for the following structures and tunnel reaches which together comprise Section 1 of the project:

- 1.□ Wilshire/La Brea Station
- 2.□ Wilshire/Fairfax Station
- 3.□ Wilshire/La Cienega Station
- 4.□ Wilshire/Western Retrieval Shaft
- 5.□ Tunnel Reach 1 (Wilshire/Western to Wilshire/La Brea)
- 6.□ Tunnel Reach 2 (Wilshire/La Brea to Wilshire/Fairfax)
- 7.□ Tunnel Reach 3 (Wilshire/Fairfax to Wilshire/La Cienega)
- 8.□ Tail Tracks (west of Wilshire/La Cienega Station)
- 9.□ Environmental Data Report, Section 1
- 10.□ SCE Ductbank at La Cienega Station

This report is prepared based on the results of investigations performed by AMEC and AMEC's predecessor company, MACTEC, during the Advanced Conceptual Engineering (ACE), Preliminary Engineering (PE) and Advanced (Adv.) PE phases of the project (all referred to herein as current investigations). The results of the ACE and PE phase investigations were previously presented in a Geotechnical and Environmental Report (Metro, 2011). The results of the Adv. PE phase investigations along with those for the ACE and PE phases are included in this report for the proposed project. In addition, subsurface information from prior investigations performed by AMEC's predecessor firms LeRoy Crandall and Associates and Law/Crandall were used in preparing this report.

The proposed SCE ductbank was planned after completion of the 2012/2013 Adv. PE investigation phase of the project. Therefore, this report is prepared utilizing the information available from explorations near the proposed SCE ductbank. It is noted that none of the prior explorations were performed directly along or at the endpoints of the trenchless installation (i.e., launching or receiving shafts). If more site-specific information is desired, then additional explorations would need to be performed.

1.1 Objectives and Scope of Work

The objective of the geotechnical and environmental investigations was to evaluate subsurface soil, groundwater, subsurface gas, and other man-made environmental conditions, for planning, design and construction of elements of Section 1 of the Westside Subway Extension project. The explorations were utilized in this report to evaluate the conditions near the proposed ductbank and temporary launching and receiving shafts, and provide recommendations for the design of the ductbank and shafts.

The proposed ductbank and temporary launching and receiving shafts will be constructed for the Los Angeles Metropolitan Transportation Authority (Metro). AMEC is the primary geotechnical consultant to the Parsons Brinckerhoff Team (PB Team), Metro's design consultant. AMEC's predecessor company MACTEC provided geotechnical and environmental services associated with the Alternatives Analysis (AA), ACE phase and PE phases of the project in support of preparation of a Final Environmental Impact Statement (EIS)/Environmental Impact Report (EIR). AMEC has also conducted the Adv. PE Phase investigations in 2012 and 2013 for Section 1 (Wilshire/Western to Wilshire/La Cienega) of the Westside Subway Extension Project.

AMEC's scope of work consisted of reviewing the subsurface data from the current and prior investigations; evaluating the static physical characteristics of the soils, groundwater, subsurface gas conditions, man-made environmental contamination, and corrosion potential of soils; and developing recommendations for excavation support of the launching and receiving shafts, and providing recommendations for the type of trenchless technology to be used for the installation of the ductbank.

1.2 Limitations and Basis for Recommendations

The professional services have been performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has been prepared for the Los Angeles County Metropolitan Transportation Authority and its design consultants to be used solely for the evaluation and construction of the proposed ductbank and the temporary launching and receiving shafts. The report has not been prepared for use by other parties, and may not contain sufficient information for purpose of other parties or other uses.

In developing the interpretations presented in this report, AMEC (PB team member) relied partly on subsurface information obtained during the Adv. PE phase and by its predecessor company MACTEC in the AA, ACE, and PE phase studies and its other predecessor companies, LeRoy Crandall and Associates and Law/Crandall, as well as subsurface information obtained by other firms. Subsurface conditions are, by their nature, uncertain and may vary from those encountered at the locations where visual inspections, borings, surveys, or other explorations were made.

2.0 PROJECT DESCRIPTION

2.1 Project Description

We understand that the proposed project consists of constructing a 20-inch diameter SCE utility ductbank using trenchless technology under the existing Los Angeles County Flood Control District (LACFCD) concrete box culvert storm drains west of the proposed Wilshire/La Cienega Station. The existing box storm drains run roughly north-south along La Cienega Boulevard. The new SCE pipe will be about 220 feet long running east-west along the middle westbound lane of Wilshire Boulevard. Based on plans dated February 19, 2014, the invert of the pipe is currently proposed to be at about Elevation 122, corresponding to a depth of about 16 to 17 feet below the ground surface (bgs) and about 3 feet below the bottom of box storm drain which has its invert at Elevation 125.

The launching shaft will be located west of La Cienega Boulevard in front of the building at 8501 Wilshire Boulevard. The launching shaft will have plan dimensions of about 25 feet by 8 feet, to be designed by the contractor. The receiving shaft will be located east of La Cienega Boulevard within the limits of the western footprint of the Wilshire/La Cienega Station and will have plan dimensions of about 15 feet by 10 feet, also to be designed by the contractor. The excavation support for both shafts is anticipated to consist of either conventional soldier pile/lagging with internal bracing or a quick-support shoring system such as a slide-rail shoring system.

The ductbank will be installed using trenchless technology eastward toward the Wilshire/La Cienega Station. Two methods of trenchless technology that are being considered are (a) pipe-jacking and (b) micro-tunneling. The excavated size of the ductbank conduit bore is expected to be less than 24 inches in diameter.

2.2 Existing Site Conditions

The proposed temporary launching and receiving shafts will be constructed in the middle westbound lane of Wilshire Boulevard. The ductbank will also be installed beneath the middle westbound lane of Wilshire Boulevard. Based on the utility plans made available, several underground utilities are located along and across the proposed ductbank; however, they are located in the upper 10 feet of the profile. Three existing LACFCD reinforced concrete storm drain boxes with dimensions of 9 feet by 7 feet (in cross-section) run under the middle of La Cienega Boulevard. Existing tieback anchors remaining from the basement construction of the building at 8501 Wilshire Boulevard are also present near the launching shaft and the ductbank, and may possibly cross the currently planned shaft and/or ductbank excavations.

The ground surface is relatively level varying in Elevation from 138 to 139. The ductbank casing pipe will have overburden soils varying in thickness from 16 to 17 feet above the invert.

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3.0 PROJECT GEOLOGY

A general overview of the geologic setting for the subway was described in the December 21, 2011 Westside Subway Extension Geotechnical and Environmental Report (Metro, 2011). The following sections provide the stratigraphic conditions and groundwater conditions at the proposed launching/receiving shafts and along the proposed ductbank.

3.1 Stratigraphy

The geologic units that will be encountered in the excavation for the launching/receiving shafts and the ductbank are primarily Holocene-age Younger Alluvium and Quaternary-age Older Alluvium. The shoring soldier piles for the shafts may extend into Pleistocene-age San Pedro Formation. Localized artificial fill associated with street and underground utility developments are also present, overlying the alluvium deposits.

The interpretation of the subsurface contacts between the geologic units in profile view is shown on Plates 1 and 2. The general lithologic compositions of the geologic units that are shown in the Geologic Profile along the alignment are presented in the following sections.

3.1.1 Artificial Fill (Profile symbol: af)

Artificial fill soils were encountered in the prior borings drilled near the proposed ductbank to a depth of up to about 5 feet beneath the existing pavement surface. The fill as encountered in the borings is comprised of medium stiff clay, sandy clay and silt.

3.1.2 Younger Alluvium (Profile symbol: Qal)

The Younger Alluvium deposit consists of Holocene-age sediments that form the surficial cover, except where artificial fill is encountered. Where encountered in exploratory borings, the Younger Alluvium consisted of olive-brown to brown and dark gray, poorly consolidated, lean clay. The maximum thickness of the Young Alluvial deposits is estimated to be up to about 20 feet. The geologic profile presented in Plate 1 shows the symbol Qal to indicate the Younger Alluvial deposits.

3.1.3 Older Alluvium (Profile symbol: Qalo)

The older alluvial deposits consist of sediments deposited by former streams and sheet flow that crossed the La Brea Plain during late Pleistocene time. These deposits are composed mainly of alluvial sediments eroded from the Santa Monica Mountains to the north that accumulated as channel/overbank deposits and alluvial fan deposits that thicken to the south and west. The sediments range from brown and gray, loose to dense sands and gravels in stream channel deposits to predominantly gray and brown to olive gray, medium stiff to hard silts and clays and gravelly silts and clays in the fan and overbank deposits. Although local channels with abundant gravel were encountered in borings, these gravelly materials were present at depths greater than where the ductbank is proposed. No cobbles or boulders were encountered in the borings drilled near the ductbank. The thickness of the Older Alluvial deposits is estimated to be less than 10 feet. The Older Alluvium deposits overly marine deposits of the early to mid-Pleistocene age San Pedro Formation. The geologic profile presented in Plate 1 uses the symbol Qalo to indicate the Older Alluvial deposits.

3.1.4 San Pedro Formation (Regional geologic map and profile symbol: Qsp)

Marine deposits of the early to mid-Pleistocene-age San Pedro Formation primarily underlie the Older and Younger Alluvium at depths below ground surface ranging from approximately 25 to 30 feet. Generally, where encountered within borings, the San Pedro Formation consisted of light to dark greenish-gray and bluish-gray, fine-grained dense sand and silty sand with interbeds of medium- to coarse-grained sand and stiff to hard silt layers. Borings drilled near the ductbank alignment encountered lean and fat clays and silt with interbedded layers of poorly graded sand and silty to clayey sands of the San Pedro Formation. Small amounts of gravel were encountered within sandier layers. Occasional cobbles, gravelly sand layers, and shell fragments were encountered commonly within the formation elsewhere along the subway alignment. Although not encountered in borings along the ductbank, occasional concretionary deposits and strongly cemented zones were encountered in borings in the San Pedro Formation elsewhere along the subway alignment. The zones were not found to be laterally continuous for significant lengths along the subway alignment and thicknesses were limited to less than 1 foot. The thickness of the San Pedro Formation is estimated to be greater than 100 feet. The geologic profile presented in Plate 1 uses the symbol Qsp to indicate the San Pedro Formation.

3.2 Groundwater

The proposed ductbank lies within the Central Basin hydrogeologic region of the coastal plain of Los Angeles County, which extends from the eastern end of the subway alignment to about the western city limits of Beverly Hills. Groundwater in the Central Basin occurs within several aquifers of the Lakewood and San Pedro Formations which are located beneath the site. The aquifers consist generally of permeable sands and gravels separated by semi-permeable to impermeable sandy clay to clay. The relatively shallow groundwater within the Younger and/or Older Alluvium has been reported as semi-perched (DWR, 1961) or perched (CWDD/ESA/GRC, 1981).

None of the groundwater monitoring wells installed during the ACE, PE and Adv. PE phases is along the 220-ft length of the proposed ductbank. However, several borings with groundwater monitoring wells were installed within few hundred feet of the site. Groundwater level measurements in these nearby ACE and Adv. PE phase monitoring wells screened within the San Pedro Formation (at depths of about 40 to 95 feet bgs) indicate depth of groundwater to be approximately between 25 to 27 feet bgs. In the shallower monitoring well screened between depths of 25 to 30 feet bgs, groundwater was measured at a depth of 23 feet bgs. Furthermore, in prior borings drilled in 1969 to 1979 by bucket-auger method, water seepage was measured as shallow as 13½ feet bgs.

Groundwater level depths measured in observation wells, overnight readings measured in borings, and depths measured during drilling of borings in ACE, PE and Adv. PE phase explorations as well as prior borings are shown on Plate 1. Groundwater levels measured in the ACE and Adv. PE phase monitoring wells are presented in Table 3-1.

Table 3-1: Monitoring Well Data from ACE and Adv. PE Phase Wells

Boring/Well No.	Location	Date Monitoring Well Installed	Date of Groundwater Measurement	Screen Depth (feet, bgs) [#]	Depth of Water (feet, bgs)
M-17*	Wilshire Blvd. between South Stanley Dr. and South Ledoux Dr.	6/28/2009	8/19/2009	85 - 95	26.7
			5/18/2011		24.2
			3/30/2012		24.9
			5/23/2012		24.8
E-120A**	Wilshire Blvd. and South Tower Dr.	6/21/2012	9/6/2012	30 - 35	28.5
E-121A**	Wilshire Blvd. between South Gale Dr. and South Hamilton Dr.	6/22/2012	9/4/2012	25 - 30	23.2
E-122A**	Wilshire Blvd. between South La Cienega Blvd. and South Hamilton Dr.	6/26/2012	9/5/2012	43 - 63	28.5
Explanation					
M-17 monitoring well was installed during ACE phase. E120A, E-121A and E-122A gas monitoring wells were installed during Adv. PE phase.					
* Wells located west of proposed SCE ductbank					
** Wells located at Wilshire/La Cienega Station and east of proposed SCE ductbank					
# bgs = below ground surface					

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4.0 FIELD EXPLORATIONS

The subsurface explorations in the vicinity of the proposed ductbank and temporary shafts consist of one seismic cone penetration test from the Adv. PE phase, two geotechnical rotary-wash borings from the PE phase, one environmental boring from the PE phase and one from the Adv. PE phase and several geotechnical borings from prior investigations. Information from nearby explorations to detect subsurface methane gas was also utilized. The locations of the borings are shown on Plate 1. A list of the subsurface explorations used in the preparation of this report is presented in Table 4-1 below.

Table 4-1: List of Subsurface Explorations

Exploration Phase (Year)	Boring No.**	Exploration Depth (ft.)
Adv. PE (2012)	C-303*	127½
PE (2011)	G-131	121½
PE (2011)	G-132	111½
Adv. PE (2012)	E-122A*	70
PE (2011)	E-122	70
ACE (2009)	M-17*	91
Prior (1979)	2 (MA-79026)	16½
Prior (1979)	2 (MA-79162)	58
Prior (1978)	4 (MA-78304)	16
Prior (1969)	4 (MA-69086)	100½

*monitoring gas and/or groundwater wells installed in the borehole. See well diagrams in Appendix C for screen depths

** C-series refers to cone penetration tests; E-series refers to environmental borings; G-series refers to geotechnical borings; M-series refers to gas investigation borings; prior borings drilled by AMEC's predecessor companies and the Job No. is shown in parenthesis

The following sections provide a brief summary of the geotechnical, subsurface methane gas explorations and environmental explorations performed near the proposed ductbank. A detailed description of the field explorations is presented in Appendix A of the Geotechnical Data Report (GDR) for Wilshire/La Brea Station (Metro, 2013).

4.1 Geotechnical Exploration

Geotechnical explorations near the proposed SCE ductbank consist of one CPT (C-303), two rotary-wash borings (G-131 and G-131), and four prior geotechnical borings. Pressuremeter testing was performed in boring G-131; however, the test depths were at depths below the ductbank and temporary shafts. Gas probes were installed in CPT C-303. The geotechnical explorations and depths explored are shown on Plate 1. The logs of borings and CPTs are presented in Appendices A and B, respectively. The monitoring well construction diagrams are presented in Appendix C.

4.2 Subsurface Gas Exploration

Like the majority of the Westside Subway Extension, the ductbank is located within an area designated as a “Methane Zone” on the 2004 “Methane and Methane Buffer Zone” map published by the City of Los Angeles, Department of Public Works.

As part of the subsurface gas investigation for the Westside Subway Extension project, gas and groundwater monitoring wells (probes and standpipes) were installed in nearby subsurface gas boring M-17. In addition, gas and groundwater monitoring wells were installed in three nearby environmental borings (E-120A, E-121A, and E-122A) and two CPT push probes (C-302 and C-303) during the Adv. PE phase at the Wilshire/La Cienega Station.

The depths of the gas probes and standpipes in the relevant ACE and Adv. PE phase wells are presented in Table 4-2 below. As described above, the wells in the table are not directly along the alignment of the ductbank but are located in a close proximity and in similar materials; therefore the subsurface gas data from these wells is considered applicable for the ductbank.

Table 4-2: Details of Gas Probes/Standpipes Installed in ACE and Adv. PE Phase Wells

Boring/ Monitoring Well No.*	Probe Depth (ft. bgs)	Standpipe Depth (ft. bgs)	Measurement/Sampling Year (number of monitoring events)	Monitoring Phase
M-17*	15, 25, 65, 90	85-90	2009 (1 event), 2011 (1 event), 2012 (2 events)	ACE, PE, Adv. PE
E-120A*	15, 25, 45	30-35, 55-70	2012 (1 event)	Adv. PE
E-121A*	15	25-30	2012 (1 event)	Adv. PE
E-122A*	15, 25	43-63	2012 (1 event)	Adv. PE
C-302*	15, 26	None	2012 (1 event)	Adv. PE
C-303*	15, 25	None	2012 (1 event)	Adv. PE

Well M-17 was installed in ACE phase; Rest of the wells were installed in Adv. PE phase
* Explorations outside SCE ductbank limits, but results are applicable

The following types of sampling and monitoring were conducted in the wells:

- Gas concentrations were measured in the standpipes and gas probes using hand-held detectors. The gas pressure in the probe or standpipe was also measured along with the barometric pressure.
- From some of the wells confirmatory gas samples were collected in Tedlar bags for analysis at a State-certified laboratory.
- The groundwater levels in the standpipes were measured.

Four sets of readings (1 event each in 2009-2010 and 2011, and 2 events in 2012) were collected in prior ACE phase wells, and presented in Table 4-3. The 2012 gas measurements in Adv. PE phase wells are presented in Table 4-4. Also presented in tables are the test results of laboratory analysis of gas samples, if collected. A bar graph of the gas measurements in a profile view are shown on Plate 3. The readings on Plate 3 indicate the maximum of the field and laboratory data.

A detailed description of the well installation and sampling procedures of the ACE, PE and Adv. PE phase monitoring wells, and field and laboratory analysis of the samples are discussed in the Appendix A of the Geotechnical Data Report (GDR) for Wilshire/La Brea Station. The boring logs and well construction diagrams of the gas wells are presented in Appendices A and C, respectively. The laboratory analytical test results are presented in Appendix F.

Table 4-3: 2009 Field and Lab Data in ACE Phase Gas Monitoring Wells

Well No.	Location	Sample	Probe	Depth to	Sampling	Probe Pressure	Methane	Methane	Hydrogen Sulfide	Hydrogen	Notes		
		Probe/Well Depth (ft)	Color	Water (ft) ¹	Date	(inches of H ₂ O) ²	(CH ₄) (%) ³	(CH ₄) (%) ³	(H ₂ S) (ppm) ⁴	(H ₂ S) (ppm) ⁴			
Data collected in 2009													
M-17	Wilshire Blvd. between South Stanley Dr. and South Ledoux Dr.	15	G		8/18/09 to 8/20/09	0.0	ND	0.041	ND	*	Above water		
		25	R			0.0	ND	*	ND	*	In water		
		65	B			0.2	ND	*	ND	*	In water		
		90	Y			0.2	ND	*	ND	*	In water		
		85-90	Standpipe	26.7									
Data collected in 2011													
M-17	Wilshire Blvd. between South Stanley Dr. and South Ledoux Dr.	15	G		5/18/2011	0.0	<u>5.8</u>	*	0.000	*	Above water		
		25	R			0.0	0.0	*	0.000	*	In water		
		65	B			0.0	0.0	*	0.000	*	In water		
		90	Y			<u>1.6</u>	0.0	*	0.000	*	In water		
		85-90	Standpipe	24.2							In water		
Data collected in 2012													
M-17	Wilshire Blvd. between South Stanley Dr. and South Ledoux Dr.	15	G		3/30/2012 and 5/23/2012	0.0/0.0	<u>6.30/3.50</u>	0.254/0.195	<u>4.0/4.0</u>	ND/ND			
		25	R			0.0/0.0	0.0/0.0	-/-	0.0/0.0	-/-			
		65	B			0.0/-	0.0/-	-/-	0.0/-	-/-			
		90	Y			0.0/0.0	0.0/0.0	-/-	0.0/0.0	-/-			
		85-90	Standpipe	24.2		<u>0.0/0.6</u>	0.0/0.0	-/-	0.0/0.0	-/-			
Explanations:													
M-17 was installed by AMEC's predecessor company MACTEC in 2009 Probe Tube Color: G – green; R – red; B – blue; Y – yellow; W – white PVC pipe "H ₂ O – Water pressure in probe; CH ₄ – Methane; H ₂ S – Hydrogen Sulfide; ppm – parts per million *The maximum limit of the gauge is 50 ppm ¹ Depth to water measured in 1" or 2" PVC pipe screened at indicated depth. ² Probe pressure readings > 0.5 inch of water underlined and italicized ³ CH ₄ readings >1.25% (25% LEL) underlined and italicized ⁴ H ₂ S readings >5ppm underlined and italicized "xx/yy" indicates two readings taken—first on 3/30/12 and second on 5/23/12													

Table 4-4: 2012 Field and Lab Data in Adv. PE Phase Gas Monitoring Wells

Well No.	Location	Sample Probe/Well Depth (ft)	Probe Color	Depth to Water (ft) ¹	Sampling Date	Probe Pressure (inches of H ₂ O) ²	Barometric Pressure (inches Hg)	Methane (CH ₄) (%) ³		Hydrogen Sulfide (H ₂ S) (ppm) ⁴		Carbon Dioxide (CO ₂) (%)	Oxygen (O ₂) (%)	Notes
								Field	Laboratory	Field	Laboratory			
E-120A	Wilshire Blvd. and South Tower Dr.	15	G		9/5/2012	NM	29.72	NM	*	NM	*			
		25	B			0.0		0.0	*	0.0	*	1.0	2.5	
		45	R			0.0		0.2	*	0.0	*	1.2	14.2	
		30-35	Standpipe	27.6		NM		NM	*	NM	*			
		55-70	Standpipe	29.1		NM		NM	*	NM	*			
E-121A	Wilshire Blvd. between South Gale Dr. and South Hamilton Dr.	15	G		9/4/2012	0.0	29.74	<u>4.9</u>	<u>2.1</u>	1.0	ND	7.4	0.0	
		25-30	Standpipe	21.5		NM		NM	*	NM	*			
E-122A	Wilshire Blvd. between South La Cienega Blvd. and South Hamilton Dr.	15	G		9/5/2012	0.0	29.72	0.0	*	0.0	*	4.3	6.9	
		25	B			0.0		0.0	*	1.0	*	1.0	0.1	
		43-63	Standpipe	28.2		NM		NM	*	NM	*			
C-302 [^]	Wilshire Blvd. and South Tower Dr.	15	Probes were tagged		8/21/2012	0.0	29.63	0.0	*	ND	*	4.3	7.9	
		26				0.0		0.0	*	ND	*	1.1	19.8	
C-303 [^]	Wilshire Blvd. and South La Cienega Blvd	15	Probes were tagged		8/21/12	0.0	29.63	0.0	*	-	*	2.0	10.9	
		25				0.0		0.0	*	-	*	3.6	0.0	

Explanations:

Probe Tube Color: G – green; R – red; B – blue; Y – yellow; W – white PVC pipe, SP – shallow PVC pipe, DP – deeper PVC pipe
 "V" indicates no reading due to pulling a vacuum in the tubing headspace (sample interval below water)
 H₂O – Water pressure in probe; CH₄ – Methane; H₂S – Hydrogen Sulfide; ppm – parts per million
[^]Monitoring wells installed in geotechnical CPTs
 *Laboratory samples were not obtained for testing
¹Depth to water measured in 1" or 2" PVC pipe screened at indicated depth.
²Probe pressure readings > 0.5 inch of water underlined and italicized
³CH₄ readings >1.25% (25% LEL) underlined and italicized
⁴H₂S readings >5ppm underlined and italicized

4.2.1 Summary of Field Measurements

Based on the field measurements in the monitoring wells installed near the ductbank alignment, the highest measured methane (CH_4) concentration was 6.3% and the highest measured hydrogen sulfide (H_2S) concentration was 4 part per million (ppm). The highest measured gas pressure was 1.6 inches of equivalent water height.

4.3 Phase II Environmental Site Assessment

None of the environmental explorations performed for the WSE project were directly along the alignment of the ductbank. However, two environmental borings (E-122, E-122A) were performed nearby during the investigations for the Wilshire/La Cienega Station.

The exploration locations were selected based on the findings of previous preliminary environmental site assessment reports that identified suspect sources of environmental concern with the highest likelihood to impact the station. Each exploration location was initially marked as close as possible to the suspect source of concern (e.g., existing dry cleaner or former gasoline station facility) while staying within the public street area under which the proposed station is planned. A summary of the suspect sources at the exploration locations is presented in Table 4-5. The locations of the environmental explorations are shown on Plate 1.

Table 4-5: Summary of Suspect Sources at Phase II Environmental Explorations

Exploration No.	Suspect Source
E-122, 122A, 122B*	Former gasoline stations
E-123, E-123A*	Closed LUST with residual groundwater contamination (8567 Wilshire)

*borings not drilled
LUST – Leaking underground storage tank
SLIC - Spills, leaks, investigation, cleanup

Details of the field explorations including soil and groundwater sampling procedures as well as the laboratory results and findings were presented in the Environmental Data Report dated May, 2013 (Metro, 2013). A summary of the environmental findings as related to the ductbank is presented in Section 6.

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5.0 LABORATORY TESTING

5.1 Geotechnical Testing

Laboratory tests were performed on selected samples obtained from the geotechnical borings to aid in the classification of the soils and to determine the pertinent engineering properties of the soil and bedrock. A list of the laboratory tests performed on the samples is presented in Table 5-1. A detailed description of the laboratory test procedures is presented in Appendix E of the Geotechnical Data Report (GDR) for Wilshire/La Brea Station.

Table 5-1: Geotechnical Laboratory Tests

Laboratory Test	Laboratory	ASTM Designation (or) other	ACE Phase	PE Phase
Field Moisture Content	AMEC/AP Engineering	D 2216	X	X
Field Dry Density	AMEC/AP Engineering	D 2937	X	X
Sieve Analysis	AMEC/AP Engineering	D 422	X	X
Passing No. 200 Sieve	AMEC/AP Engineering	D 1140	X	X
Atterberg Limits	AMEC/AP Engineering	D 4318	X	X
Direct Shear	AMEC/AP Engineering	D 3080	X	X
Specific Gravity	AMEC/AP Engineering	C 127/128	-	X
Triaxial Unconsolidated-Drained	AP Engineering	D 4767	-	X
Unconfined Compression	AP Engineering	D 2166	-	-
Consolidation/Hydroconsolidation	AMEC/AP Engineering	D 2435	-	X
Expansion/Collapse	AMEC/AP Engineering	D 2435	-	X
Corrosion	HDR-Schiff Associates	Caltrans method	X	X
Abrasion	University of Texas, Austin	NTNU-SINTEF	-	-

The laboratory test results of the ACE and PE phase investigations are presented in Appendix D. Relevant laboratory test results from prior investigations are also included in Appendix D. A summary of the test results in a tabular form is presented in Table 5-2 for ACE and PE phase investigations and in Table 5-3 for other prior investigations.

Soil corrosivity testing was performed by HDR/Schiff Associates under a subcontract with AMEC for the adjacent Wilshire/La Cienega Station. The applicable test results at depths where the ductbank and the temporary shafts are planned are included in Table 5-2. The test sheets are included in Appendix E.

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Table 5-2: Summary of Geotechnical Laboratory Test Results (ACE and PE Phases)

Boring No.	Sample Depth (ft)	Sample Type	USCS Group Symbol	Geologic Formation	Raw Blow Count (blows/ft)	Equivalent SPT Blow Count (blows/ft)	Moisture Content (%)	Dry Density (pcf)	Grain Size			Atterberg Limits			Expansion /Collapse (%)	Specific Gravity	Corrosion				Compression Indices		Tar Content (%)	Void Ratio	NTNU Soil Abrasion Index	Direct Shear ¹		Poisson's Ratio	Triaxial Consolidated-Undrained ²		Unconfined Compression Strength (psi)
									Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)			pH	Sulfate (ppm)	Chloride (ppm)	Minimum Resistivity (ohm-cm)	C _c	C _r				Cohesion (psf)	Friction Angle (degrees)		Cohesion (psf)	Friction Angle (degrees)	
G-131	5.5	CR	CL-ML	Qal	12		32.0	87																							
	10.5	SPT	SM	Qalo	16		12.9	-	3	75	22	31	22	9																	
	15.5	CR	SW	Qalo	23		10.0	-																							
	20.5	SPT	ML	Qsp	14		25.9	-										2.72	8	153	15	1080									
	25.5	CR	ML	Qsp	20		25.2	99				43	16	27														300	36		
	30.5	SPT	CL	Qsp	16		38.1	-																							
	35.5	CR	MH	Qsp	11		32.7	87	0	9	91	61	31	30																	
	40.5	SPT	ML	Qsp	14		21.6	-																							
	45.5	CR	CL	Qsp	11		15.1	111				29	18	11													350	36			
	50.5	SPT	CL	Qsp	46		22.3	-	0	49	51																				
	55.5	CR	SM	Qsp	19		19.3	78	1	53	46				0.02																
	60.5	SPT	SM	Qsp	23		25.1	-																							
	65.5	CR	SC	Qsp	15		25.3	99	25	33	42	43	26	17									0.0168		0.68						
	70.5	SPT	SC	Qsp	17		43.3	-																							
	75.5	CR	SC	Qsp	10		39.7	80																							
	80.5	SPT	SM	Qsp	72		14.8	-	12	70	18																				
	85.5	CR	SM	Qsp	26		28.8	94							0.00																
	90.5	SPT	SM	Qsp	23		33.9	-							2.74	8	1002	33	600												
	95.5	CR	SM	Qsp	24		18.7	110	14	59	27												0.0136		0.52						
	100.5	SPT	SM	Qsp	30		21.6	-																							
	105.5	CR	MH	Qsp	21		34.9	85				78	43	35																	
	110.5	SPT	MH	Qsp	50		20.6	-																							
	115.5	NR	ML	Qsp	57		32.7	-																							
	120.5	SPT	ML	Qsp	34		22.0	-																							
G-132	6.5	CR	CL	Fill	27		-	-																							
	10.5	SPT	CL	Qal	10		29.4	-								2.65	8	108	41	1000											
	15.5	CR	CL	Qal	8		-	-				33	17	16													250	32			
	20.5	SPT	CL	Qal	9		33.3	-																							
	25.5	CR	CL	Qalo	17		19.5	108	0	23	77	42	21	21																	
	30.5	SPT	CL	Qalo	22		28.1	-																							
	35.5	CR	MH	Qsp	14		26.5	89	0	11	89	67	36	31												0.86	750	24			
	40.5	SPT	MH	Qsp	13		37.0	-																							
	45.5	CR	MH	Qsp	27		29.7	91	0	9	91	70	40	30	-0.18									0.0527	0.0236	0.82					
	50.5	SPT	MH	Qsp	29		25.3	-																							
	55.5	CR	CL	Qsp	55		33.0	97																							
	60.5	SPT	SM	Qsp	69		18.4	-	2	82	16	NP	NP	NP																	

Table 5-2: Summary of Geotechnical Laboratory Test Results (ACE and PE Phases)

Boring No.	Sample Depth (ft)	Sample Type	USCS Group Symbol	Geologic Formation	Raw Blow Count (blows/ft)	Equivalent SPT Blow Count (blows/ft)	Moisture Content (%)	Dry Density (pcf)	Grain Size			Atterberg Limits			Expansion /Collapse (%)	Specific Gravity	Corrosion				Compression Indices		Tar Content (%)	Void Ratio	NTNU Soil Abrasion Index	Direct Shear ¹		Poisson's Ratio	Triaxial Consolidated-Undrained ²		Unconfined Compression Strength (psi)
									Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)			pH	Sulfate (ppm)	Chloride (ppm)	Minimum Resistivity (ohm-cm)	C _c	C _r				Cohesion (psf)	Friction Angle (degrees)		Cohesion (psf)	Friction Angle (degrees)	
G-132	65.5	NR	SM	Qsp	91		-	-																							
	70.5	SPT	CL	Qsp	41		18.8	-				49	27	22																	
	75.5	CR	SP	Qsp	49		9.7	120							0.11									0.37		1400	25				
	80.5	SPT	SC	Qsp	64		10.3	-	1	80	19				2.65																
	85.5	NR	SC	Qsp	68/9"		-	-																							
	88.5	NR	SC	Qsp	75/8"		-	-																							
	90.5	SPT	ML	Qsp	63		23.4	-	0	38	62																				
	95.5	CR	ML	Qsp	86/9"		34.4	91																0.82	0	31					
	100.5	SPT	CL	Qsp	42		27.8	-	0	29	71				0.00																
	105.5	CR	CL	Qsp	46		20.0	107															0.0173	0.55							
	110.5	SPT	SC	Qsp	65		16.8	-																							

CR Crandall Sampler

SPT Standard Penetration Test Sampler

"Gravel" Particle size greater than No. 4 sieve

"Sand" Particle size less than No. 4 sieve but greater than No. 200 sieve

"Fines" Particle size less than No. 200 Sieve

NP Non-plastic

Quaternary Younger Alluvium - Qal

Quaternary Older Alluvium - Qalo

San Pedro - Qsp

¹ Cohesion and Friction Angle from direct shear tests are based on yield values. See Appendix E of Wilshire/La Brea GDR for discussion on how yield values were picked

² Cohesion and Friction Angle from triaxial tests are based on peak values

Table 5-3: Summary of Geotechnical Laboratory Test Results (Prior Projects)

Project and Boring No.	Sample Depth (ft)	Sample Type	USCS Group Symbol	Geologic Formation	Raw Blow Count (blows/ft)	Equivalent SPT Blow Count (blows/ft)	Moisture Content (%)	Dry Density (pcf)	Grain Size			Atterberg Limits			Expansion /Collapse (%)	Specific Gravity	Corrosion				Compression Indices		Tar Content (%)	Void Ratio	NTNU Soil Abrasion Index	Direct Shear		Poisson's Ratio	Triaxial Consolidated-Undrained		Unconfined Compression Strength (psi)
									Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)			pH	Sulfate (ppm)	Chloride (ppm)	Minimum Resistivity (ohm-cm)	C _c	C _r				Cohesion (psf)		Friction Angle (degrees)			
									Cohesion (psf)		Friction Angle (degrees)																				
MA-69086-B (4)	2	CR	CL-ML	Qal			33.2	88																							
	6	CR	ML	Qal			20.5	103																							
	10	CR	ML	Qal			20.0	108																							
	14	CR	SM	Qal			27.2	96																							
	18	CR	CL-ML	Qal			23.5	102																							
	22	CR	ML	Qsp			27.6	97																							
	26	CR	ML	Qsp			26.7	97																							
	30	CR	ML / CL-ML	Qsp			34.3	88																							
	34	CR	ML	Qsp			20.7	108																							
	38	CR	ML	Qsp			19.8	110																							
	42	CR	ML	Qsp			24.2	108																							
	44	CR	ML	Qsp			24.1	104																							
	46	CR	SM	Qsp			20.3	107																							
	48	CR	SM	Qsp			26.1	98																							
	50	CR	SM	Qsp			15.0	118																							
	52	CR	ML	Qsp			17.8	112																							
	55	CR	ML	Qsp			24.7	104																							
	60	CR	ML	Qsp			20.3	108																							
	65	CR	SM	Qsp			22.5	106																							
	70	CR	SP	Qsp			16.8	111																							
	75	CR	CL-ML	Qsp			37.9	84																							
	80	CR	ML	Qsp			26.5	94																							
	85	CR	ML	Qsp			30.9	92																							
	90	CR	ML	Qsp			30.4	92																							
	95	CR	CL-ML	Qsp			28.9	95																							
	100	CR	ML	Qsp			24.5	101																							
MA-79026 (2)	3.5	CR	CL-ML	Qal			26.2	97																							
	6.5	CR	CL-ML	Qal			19.4	110																							
	10	CR	CL-ML	Qal			24.8	97																							
	13	CR	ML	Qal			23.1	104																							
	16	CR	ML	Qal			23.5	103																							
MA-79162 (2)	4.5	CR	CL-ML	Qal			24.6	98																							
	9.0	CR	CL-ML	Qal			25.6	95																							
	12.5	CR	CL-ML	Qal			21.0	102																							
	16.5	CR	CL-ML	Qal			23.2	103																							
	20.5	CR	CL-ML	Qalo			29.1	93																							
	24.5	CR	CL-ML	Qalo			33.2	87																							
	28.5	CR	ML	Qsp			31.6	91																							

Table 5-3: Summary of Geotechnical Laboratory Test Results (Prior Projects)

Project and Boring No.	Sample Depth (ft)	Sample Type	USCS Group Symbol	Geologic Formation	Raw Blow Count (blows/ft)	Equivalent SPT Blow Count (blows/ft)	Moisture Content (%)	Dry Density (pcf)	Grain Size			Atterberg Limits			Expansion /Collapse (%)	Specific Gravity	Corrosion				Compression Indices		Tar Content (%)	Void Ratio	NTNU Soil Abrasion Index	Direct Shear		Poisson's Ratio	Triaxial Consolidated-Undrained		Unconfined Compression Strength (psi)
									Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)			pH	Sulfate (ppm)	Chloride (ppm)	Minimum Resistivity (ohm-cm)	C _c	C _r				Cohesion (psf)					
MA-79162 (2)	32.5	CR	CL-ML	Qsp			18.8	112																							
	37.0	CR	SM	Qsp			13.7	121																							
	40.5	CR	ML	Qsp			22.6	105																							
	44.5	CR	SW	Qsp			25.3	100																							
	54.0	CR	SM	Qsp			14.9	116																							
	58.5	CR	ML	Qsp			18.3	110																							
MA-78304 (4)	2.5	CR	CL-ML	Qal			34.6	86													0.159	0.030		0.92		810	12	0.44			
	5	CR	CL-ML	Qal			36.0	82																	1.02						
	7	CR	CL-ML	Qal			34.3	86																	0.92						
	9	CR	CL-ML	Qal			33.9	85																	0.95						
	12	CR	SW	Qal			7.3	105																	0.57						
	15.5	CR	ML	Qal			24.4	101																	0.64						
CR Crandall Sampler "Gravel" Particle size greater than No. 4 sieve "Sand" Particle size less than No. 4 sieve but greater than No. 200 sieve "Fines" Particle size less than No. 200 Sieve NP Non-plastic Quaternary Younger Alluvium - Qal Quaternary Older Alluvium - Qalo Lakewood - Qlw San Pedro - Qsp																															

6.0 SUMMARY AND FINDINGS OF PRIOR ENVIRONMENTAL INVESTIGATION

The ductbank alignment is located near two suspect sources for potential contamination. The two nearby sources are former gas stations located at 8501 Wilshire Boulevard and at 8483 Wilshire Boulevard as shown on Plate 1. Therefore, environmental explorations E-122, E-122A and E-123 were drilled during the PE and Adv. PE phases around La Cienega and Wilshire Boulevards to further investigate the area for potential contamination and to evaluate the lateral and vertical extent of contamination. It is noted that none of the environmental explorations are located at the temporary shafts or along ductbank alignment. Environmental exploration E-123 is located west of the launching shaft, and E-122 and E-122A are located east of the receiving shaft.

The laboratory test results of soil and groundwater samples collected in E-122 which is located approximately 40 feet east of the receiving shaft indicated non-detectable (ND) results for Volatile Organic Compounds (VOCs) and for Total Petroleum Hydrocarbons (TPH) in gas, diesel and oil ranges (GRO, DRO, and ORO). The soil samples were taken at 20, 40, and 60 feet bgs and the groundwater sample was obtained at a depth of 50 feet bgs.

The laboratory test results of soil samples collected in E-122A which is about 130 feet east of the receiving shaft indicated that the soil was impacted with several VOCs and TPH-GRO at 20 and at 60 feet bgs. Groundwater was also impacted with several constituents of concern. Based on these results, the soil is considered to be impacted and will need to be disposed at a Class II landfill.

The laboratory test results of soil samples collected in E-123 were ND for VOCs and for TPH-GRO, - DRO, and- ORO. However, the soil samples analyzed were at depths of 55, 60, and 75 feet bgs and not near the depths where the ductbank is planned.

Based on the above summary, one of the three borings in the vicinity of the site indicated impacted soils which would need to be disposed of at a Class II landfill. Due to the lack of a more site-specific boring(s) and test data at the shafts and conduit at this time, the soils within the excavations should be assumed to be impacted and would need disposal at a Class II landfill.

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7.0 ENGINEERING PROPERTIES OF PRINCIPAL GEOLOGIC UNITS

The principal geologic units anticipated within the excavations for SCE ductbank and launching and receiving shafts are Holocene-age- Younger Alluvium and Quaternary-age- Older Alluvium. Excavations for the shoring soldier piles might extend into Pleistocene-age San Pedro Formation. Engineering properties were compiled in these three geologic units and a statistical analysis was performed to estimate the lower bound, upper bound and a best estimate. For San Pedro Formation, soils to a depth of about 40 feet bgs were considered in the evaluation. The properties were evaluated by sub-dividing each geologic unit into fine grained and coarse grained before performing the statistical analysis. The engineering properties obtained for the design and construction of the shaft are listed below.

- SPT Blow counts
- Moisture Content
- Dry Density and Total Density
- Fines Content
- Specific Gravity
- Liquid Limit
- Plasticity Index
- Expansion/Collapse
- Degree of Saturation
- Void Ratio
- Effective Cohesion and Friction Angle
- Undrained Cohesion and Friction Angle
- Unconfined Compressive Strength
- Poisson's ratio
- Compression Index (C_c)
- Recompression Index (C_r)
- At-rest Lateral Earth Pressure Coefficient (k_o)
- Soil Abrasion
- Corrosion

The estimated range (lower bound, upper bound) and a best estimate of the engineering properties listed above are presented in Table 7-1.

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Table 7-1: Engineering Properties of Principal Geologic Units

Geologic Formation	Younger Alluvium (Qal)				Older Alluvium (Qalo)				San Pedro (Qsp)			
Predominant Grain Size	Coarse-Grained		Fine-Grained		Coarse-Grained		Fine-Grained		Coarse-Grained		Fine-Grained	
USCS Soil Classification	SM, SW		CL, ML, CL-ML		SW, SW		CL-ML		SM		ML, CL, MH, CL-ML	
Engineering Properties	Range ¹	Design Value ¹	Range ¹	Design Value ¹	Range ¹	Design Value ¹	Range ¹	Design Value ¹	Range ¹	Design Value ¹	Range ¹	Design Value ¹
SPT Blowcounts ²	*	*	9 to 22**	10**	16**	16 **	*	*	*	*	13 to 16	14
Moisture Content (%)	7 to 27**	17**	19 to 36	25	10 to 13**	11**	29 to 33**	31**	14**	14**	19 to 38	27
Dry Density (pcf)	96 to 105**	101**	82 to 110	100	*	*	87 to 93**	90**	121**	121 **	87 to 112	97
Total Density (pcf)	113 to 122**	117**	112 to 131	123	*	*	116 to 120**	118**	138**	138 **	113 to 133	124
Fines Content (%)	*	*	77**	77 **	22**	22 **	*	*	*	*	89 to 91**	90**
Specific Gravity	*	*	2.65**	2.65**	*	*	*	*	*	*	2.72**	2.72 **
Liquid Limit (%)	*	*	33 to 42**	38**	31**	31 **	*	*	*	*	43 to 67**	61**
Plasticity Index (%)	*	*	16 to 21**	19**	9**	9**	*	*	*	*	27 to 31**	30**
Expansion (%)	NA	NA	*	*	NA	NA	*	*	NA	NA	*	*
Collapse (%)	*	*	*	*	*	*	*	*	*	*	*	*
Degree of Saturation (%) [#]	34 to 100**	67**	90 to 100	99	*	*	98 to 99**	98**	99**	99**	82 to 100	100
Void Ratio	0.57 to 0.72**	0.65**	0.50 to 1	0.66	*	*	0.78 to 0.90**	0.84**	0.37**	0.37**	0.48 to 0.90	0.70
Effective Friction Angle from Direct Shear Test ³ (degrees)	26**	26 **	12**	12 **	*	*	*	*	*	*	9 to 24**	17**
Effective Cohesion from Direct Shear Test ³ (psf)	250**	250 **	810 to 900**	855**	*	*	*	*	*	*	750 to 1000**	875**
Effective Friction Angle from Triaxial Test ⁴ (degrees)	*	*	32**	32**	*	*	*	*	*	*	36**	36**
Effective Cohesion from Triaxial Test ⁴ (psf)	*	*	250**	250**	*	*	*	*	*	*	300**	300**
Undrained Friction Angle from Triaxial Test ⁴ (degrees)	*	*	29**	29**	*	*	*	*	*	*	28**	28**
Undrained Cohesion from Triaxial Test ⁴ (psf)	*	*	100**	100**	*	*	*	*	*	*	100**	100**
Unconfined Compressive Strength (psi)	NA	NA	*	*	NA	NA	*	*	NA	NA	*	*
Poisson's Ratio	0.36**	0.36 **	0.44***	0.44 **	*	*	*	*	*	*	0.37 to 0.46**	0.41**
Hydraulic Conductivity ⁵	10 ⁻² to 50	5	10 ⁻⁷ to 10 ⁻¹	10 ⁻⁵	10 ⁻² to 50	5	10 ⁻⁷ to 10 ⁻¹	10 ⁻⁵	10 ⁻² to 50	5	10 ⁻⁷ to 10 ⁻¹	10 ⁻⁵
Compression Index (Cc)	*	*	0.160**	0.160 **	*	*	*	*	*	*	*	*
Recompression Index (Cr)	*	*	0.030**	0.030 **	*	*	*	*	*	*	*	*
At-Rest Soil Pressure Coeff., Ko	*	*	*	*	*	*	*	*	*	*	0.62**	0.62 **
Soil Abrasion Test	*	*	*	*	*	*	*	*	*	*	*	*
Corrosivity Results: ⁶												
Minimum Resistivity (ohm-cm)	*	*	1,000**	1,000 **	*	*	*	*	*	*	1,080**	1,080 **
pH	*	*	8.0**	8.0**	*	*	*	*	*	*	8.1**	8.1**
Chloride Content (ppm or mg/kg)	*	*	41**	41 **	*	*	*	*	*	*	15**	15**
Sulfate Content (ppm or mg/kg)	*	*	108**	108 **	*	*	*	*	*	*	153**	153**

Table 7-1 (Continued): Engineering Properties of Principal Geologic Units

Geologic Formation	Younger Alluvium (Qai)				Older Alluvium (Qalo)				San Pedro (Qsp)			
Predominant Grain Size	Coarse-Grained		Fine-Grained		Coarse-Grained		Fine-Grained		Coarse-Grained		Fine-Grained	
USCS Soil Classification	SM, SW		CL, ML, CL-ML		SW, SW		CL-ML		SM		ML, CL, MH, CL-ML	
Engineering Properties	Range ¹	Design Value ¹	Range ¹	Design Value ¹	Range ¹	Design Value ¹	Range ¹	Design Value ¹	Range ¹	Design Value ¹	Range ¹	Design Value ¹
* No test data ** Limited data; reported values are based on data from adjacent station and reaches/correlation with other soil and bedrock properties/published data in literature, and/or based on our prior experience "NP" indicates non-plastic material # Estimated using assumed specific gravity of 2.65 when a specific gravity test was not performed "NA" indicates engineering property not applicable for the material type pcf = pounds per cubic foot; psf = pounds per square foot; psi = pounds per square inch; cm = centimeter; ppm = parts per million; mg = milligrams; kg = kilograms												
Notes: 1. Data presented here are based on ACE, PE and Adv. PE phase explorations as well as applicable prior explorations 2. Blow counts from environmental hollow-stem-auger borings were not considered 3. Effective cohesion and friction angle are based on yield values from slow direct shear tests. See figure in Appendix E of Wilshire/La Brea GDR on how yield values were determined 4. Cohesion and friction angle are based on peak shear strength values from Triaxial consolidated-drained tests. Effective values are based on effective stress and undrained values are based on total stress 5. Hydraulic conductivity values were based on published data (Department of Water Resources Bulletin 118, California's Groundwater Update, 2003) 6. For soil corrosivity, the design values correspond to minimum resistivity, lowest pH and highest values for chloride and sulfate content												

8.0 DESIGN AND CONSTRUCTION

This section provides a summary of the geotechnical evaluation of the subsurface conditions at the sites of the temporary shafts and along the ductbank alignment and their impact on the design and construction of these structures.

8.1 Geotechnical Considerations

The excavations for the temporary shafts and the ductbank will be performed primarily in Holocene-age-Younger Alluvium and Quaternary-age-Older Alluvium. Shoring for excavation support of the shafts might extend into Pleistocene-age San Pedro Formation. The soils in these formations predominantly consists of medium stiff to stiff clays and silts interlayered with occasional medium dense to dense silty sands and sands. Excavation in these soils can be performed using conventional earth-moving equipment.

Certain challenges will have to be addressed in conjunction with excavation, such as the presence of major utility lines crossing along Wilshire and La Cienega Boulevards and the presence of existing steel-and-concrete tieback anchors from former basement construction that may protrude into the planned excavation. All utilities will have to be carefully protected in place or relocated where possible.

8.2 Launching and Receiving Shafts

8.2.1 Groundwater Levels and Water Inflows

Groundwater as shallow as 23 feet was measured in a shallower observation well installed at the site. The observation well was screened at a depth of about 25 to 30 feet bgs, which is about 8 to 13 feet below the pipe invert. In the prior borings drilled between 1969 and 1979 (about 35 to 45 years ago), groundwater seepage as shallow as 13½ feet bgs was observed during drilling in the bucket-auger method. The primary water bearing zone at this depth is the silty sand layer between depths of about 15 to 20 feet bgs (see Plate 2) which is underlain by a finer-grained clayey soil. Considering the granular zone at this depth, it is suggested that a shallower water level of 13½ feet be used for design and construction purposes.

Assuming the groundwater level at 13½ feet bgs and a hydraulic conductivity of 10^{-5} centimeter per second for the silty sand soils in the water-bearing zone, the water inflow into the shafts is not anticipated to exceed 5 gallons per minute (gpm). Groundwater inflows can be controlled by gravel-filled trenches and sumps equipped with pumps. The need for dewatering wells is not anticipated.

8.2.2 Excavation Support

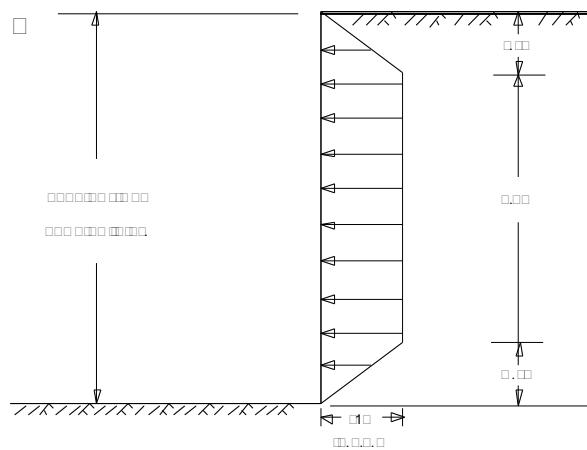
Excavations as deep as 17 feet will be needed for the launching and receiving shafts to install the proposed ductbank. Due to the size of the shafts, an internally braced shoring is assumed. Shoring systems such as soldier piles with wood or shotcrete lagging supported by internal bracing with struts and walers may be used. Alternatively, a proprietary shoring system such as a slide-rail system may be used for excavation support.

The following sections provide general recommendations for the design and construction of shoring braced with internal struts/walers for the launching and receiving pits.

8.2.2.1 Lateral Earth Pressures

Shoring up to 17 feet deep will be required for support of excavations for the pits. For design of braced shoring system (internally braced with struts or other proprietary-type braced shoring), the use of a trapezoidal distribution of earth pressure is recommended.

The recommended pressure distribution, for the case where the grade is level behind the shoring, is illustrated in the following diagram with the maximum pressure equal to $21H$ in pounds per square foot, where H is the height of the shoring in feet.



These earth pressures assume a level backfill. If the ground surface retained by shoring is sloped, the increase in earth pressure will need to be evaluated on a case-by-case basis.

8.2.2.2 Hydrostatic Pressures

The lower few feet of the shoring will be located below the groundwater level. Permeable shoring systems such as soldier pile and lagging system need not be designed for hydrostatic pressures. If shotcrete is used instead of wood lagging, weep holes should be placed to provide drainage of the retained soils. If weep holes are provided, hydrostatic pressures need not be considered in the design.

8.2.2.3 Surcharge Pressures

Shoring should be designed to resist a uniform lateral pressure of 100 pounds per square foot due to HS20 traffic loading. Applicable surcharge pressures from adjacent buildings and foundations of minor structures should be estimated and added to the earth pressures. Surcharge pressures from heavily loaded construction cranes and other equipment and traffic should be added as well.

8.2.2.4 Seismic Earth Pressures

The Metro Seismic Criteria does not provide specific recommendation for computing seismic earth pressures for temporary shoring and permanent walls, but Metro standard drawing SS-003 presents a guideline for seismic earth pressure due to retained soil and due to adjoining building. Considering that the shoring will be in-place for less than a year, seismic earth pressures need not be considered in the design.

8.2.2.5 Design of Soldier Piles

For the design of soldier piles spaced at least two diameters on centers, the allowable lateral bearing value (passive value) of the soils above groundwater level, may be assumed to be 500 pounds per square foot per foot of depth (pcf) below the excavated surface, up to a maximum of 5,000 pounds per square foot. For soils below groundwater level, the allowable lateral value (passive value) of the soils below the level of excavation may be assumed to be 250 pounds per square foot per foot of depth at the excavated surface, up to a maximum of 2,500 pounds per square foot. The passive values include a multiplication factor of 1.5 as recommended by Metro to account for the three-dimensional effects of the passive wedge. A one-third increase in the lateral bearing value may be used when considering seismic and other transient loads for ancillary structures.

To develop the full lateral value, provisions should be taken to assure firm contact between the soldier piles and the undisturbed soils. The concrete placed in the soldier pile excavations may be a lean-mix concrete. However, the concrete used in that portion of the soldier pile, which is below the planned excavated level, should be of sufficient strength to adequately transfer the imposed loads to the surrounding soils.

8.2.2.6 Laggering

The soldier piles and struts should be designed for the full anticipated lateral pressure. Continuous lagging will be required between the soldier piles. The lagging should be designed in accordance with the drawing for Cut and Cover Underground Structures, titled “Construction Structures Loads and Design Criteria.” If shotcrete is used, weep holes should be provided to relieve hydrostatic pressures.

8.2.2.7 Internal Bracing

Internal struts and walers may be used to internally brace the soldier piles. The strut loads should be determined based on the lateral earth pressures for braced condition. The vertical spacing between the struts should be designed to reduce ground movements. All struts should be tightly fitted to eliminate any slack and to reduce ground movement.

8.2.2.8 Deflection

The amount of deflection of a shored embankment is dependent on the flexibility of the shored wall, excavation methods, and spacing of support members such as soldier piles, struts, etc. It should be realized, however, that some deflection will occur. Braced shoring will typically deflect less than tieback shoring. Deflection of braced shoring is highly dependent on strut spacing, strut stiffness, and whether preloading is performed. Based on the prior experience, deflection of braced shoring is anticipated to be on the order of 1 inch or less.

If greater deflection than anticipated occurs during construction, additional bracing may be necessary to minimize settlement of the adjacent buildings and utilities in the adjacent streets. If it is desired to reduce the deflection of the shoring, a greater earth pressure could be used in the shoring design, such as a design based on at-rest pressure condition.

8.2.2.9 Monitoring

Some means of monitoring the performance of the shoring system is recommended. The monitoring should consist of periodic surveying of the lateral and vertical locations of the tops of all the soldier

piles. The surveying should be performed either weekly or at the completion of every 5 feet of excavation, whichever occurs first. All survey data should be reviewed by the engineer-of-record, in a timely manner, so as to evaluate the lateral and vertical movement of the shoring and assess the need for any corrective measures.

8.3 Installation of SCE Ductbank

The 220-foot section of ductbank can be installed using a trenchless technology consisting of either (a) pipe-jacking method or (b) micro-tunneling method. These two methods are similar with the exception that the pipe-jacking equipment will need a greater jacking load than the micro tunneling equipment. We understand that the ductbank will consist of a steel casing pipe sized for the required number of conduit compartments that it must contain.

As stated in Section 8.2.1, groundwater as shallow as 13½ feet bgs may be expected at the site. The primary water bearing zone at this depth is the silty sand layer between depths of about 15 to 20 feet bgs (see Plate 2) where the proposed ductbank is planned. Some caving of these granular soils should be anticipated during drilling. If a pipe-jacking method is used, the contractor should ensure that the casing is always several feet ahead of the auger to prevent water inflows and potential for caving of the soils. Recommendations for two installation methods are provided below.

It is essential for continuous monitoring of the volume of soil cuttings being removed from the casing pipe regardless of the method used for advancing the casing pipe. The volume of soil cuttings must be compared immediately to the volume of the casing pipe that has been advanced into the soil formation. The swell factor for the soil cuttings should be calculated based on tests made in the bottom of the launching shaft during construction as it is nearing its full depth. A typical swell factor for soils similar to the Older Alluvium is 12 to 15 percent.

Existing tieback anchors from the basement construction of the building at 8501 Wilshire Boulevard may interfere with the installation of the ductbank. If the installation of the conduit cannot proceed due to an obstruction from the tieback anchor, a narrow pit can be excavated to remove the anchor within the diameter of the conduit. The pit can then be backfilled with one-sack sand-cement slurry within the 2-foot conduit diameter zone and two-sack sand-cement slurry above and extending to the ground surface. The excavation can then proceed using one of the two installation methods.

8.3.1 Pipe-Jacking

In the pipe-jacking method, the soil inside the casing pipe is excavated using mechanical method (auger) after the pipe is pushed into the undisturbed soil formation by applying an axial force using hydraulic jacks at the end of the pipe in the launching shaft. The reaction for the hydraulic jacks is on the back side of the launching shaft. For the purpose of estimating the axial pipe-jacking load, the following soil parameters may be used:

Cohesion = 600 pounds per square foot (psf) (4.2 psi)
Friction Angle = 25 degrees
Total Unit Weight = 130 pounds per cubic foot

The passive resistance (lateral bearing) of the soil against the pipe jacking frame may be assumed to be equal to a uniform allowable pressure of 4,000 psf. The allowable pressure may be multiplied by a factor of safety of 1.65 to estimate the ultimate lateral bearing value.

8.3.2 Micro-tunneling

As an alternative to pipe-jacking, a micro-tunneling option may be used to excavate the bore for the ductbank. In the micro-tunneling method, the bore is excavated by equipment that is at the face of the bored hole. Soil cuttings are removed from the bore and the casing pipe is advanced so that the front end of the casing pipe is always immediately behind the tunneling machine. The tunneling machine is disassembled in the receiving shaft when the casing pipe for the SCE ductbank is completely installed.

The soils along the excavation are anticipated to consist of fine-grained clays and silts and coarse-grained silty sand and sands. The grain size distribution of the soils anticipated in the excavation is presented in Appendix D.

Using the Atterberg limit tests, an evaluation was made for clogging potential of soils anticipated in the excavation (Thewes and Burger, 2005). The results of the clogging potential analysis are presented in Plate 4. Based on such evaluation, the materials are anticipated to have medium to high clogging potential.

8.4 Corrosion Potential of Soils

To evaluate the potential for deleterious effects of the on-site soils on structural concrete and steel and on metal piping, chemical testing performed on selected soil samples in the upper 20 feet from nearby borings were used in the evaluation. Based on the corrosion test results, the on-site soils are corrosive to ferrous metals, aggressive to copper, and sulfate attack on concrete is considered to be negligible. Fusion-bonded epoxy may be considered as a corrosion-protection coating for the casing pipe. Corrosion-protection coating of the welded joints must be performed in the field at the bottom of the receiving shaft.

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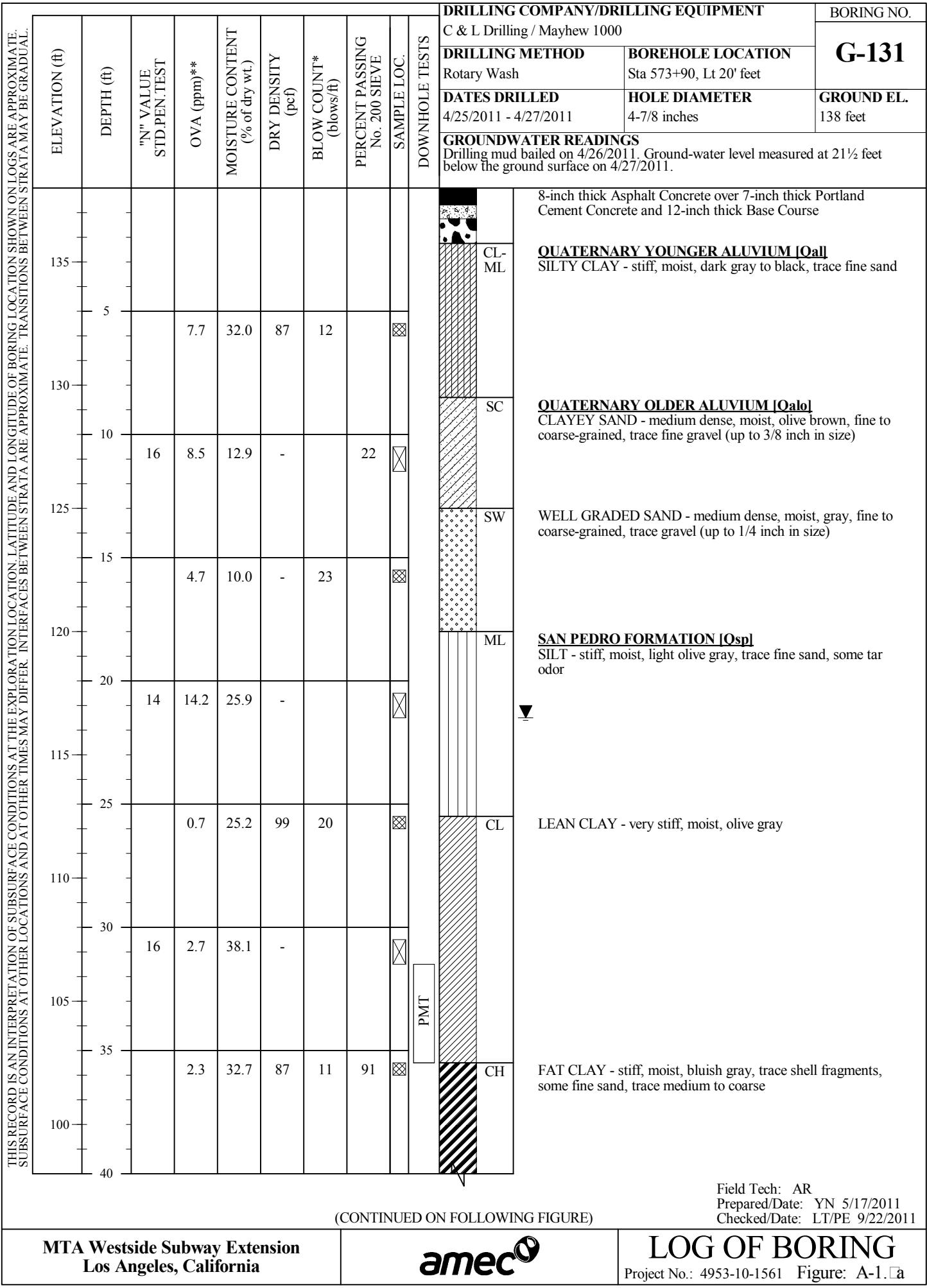
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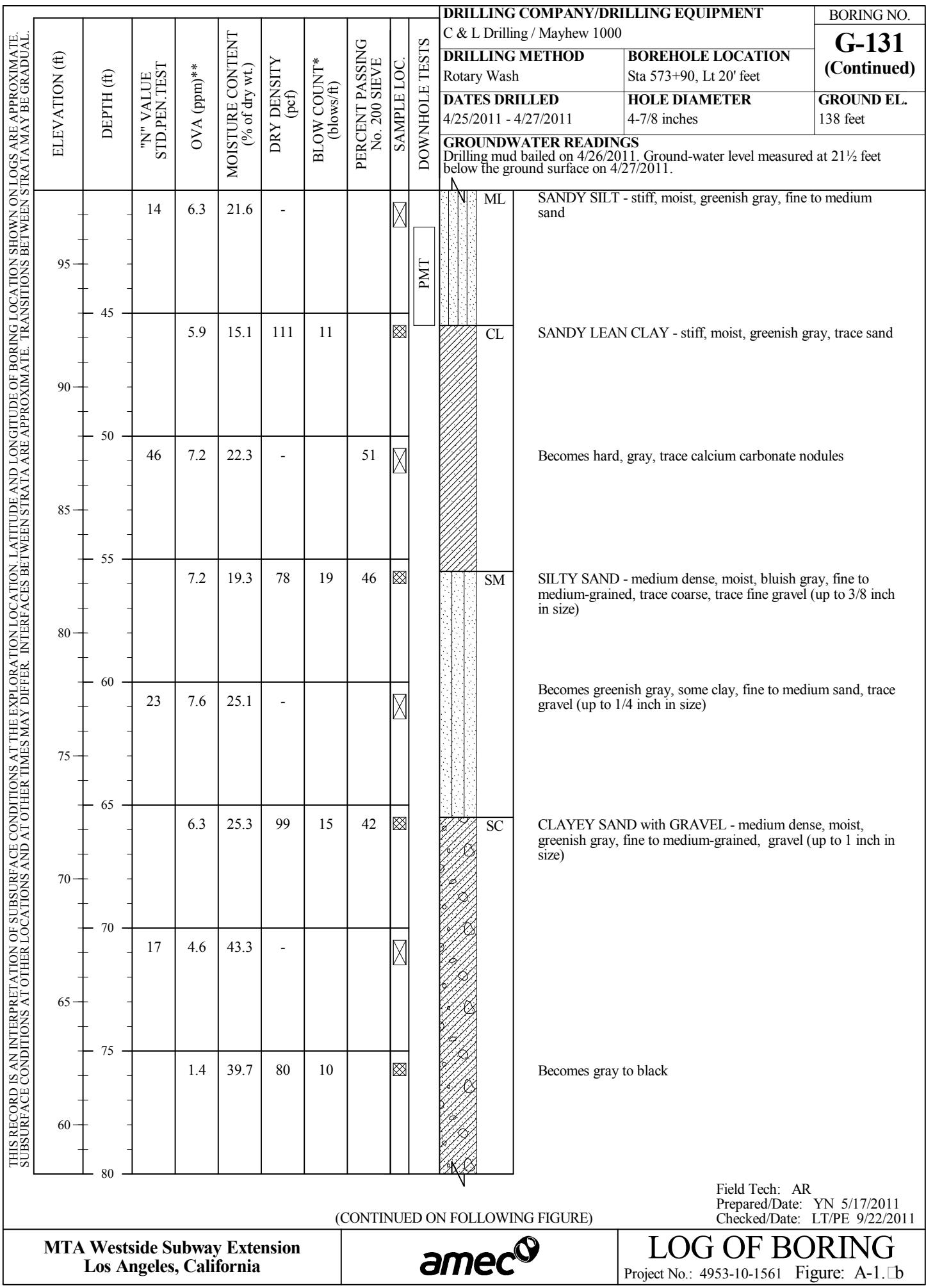
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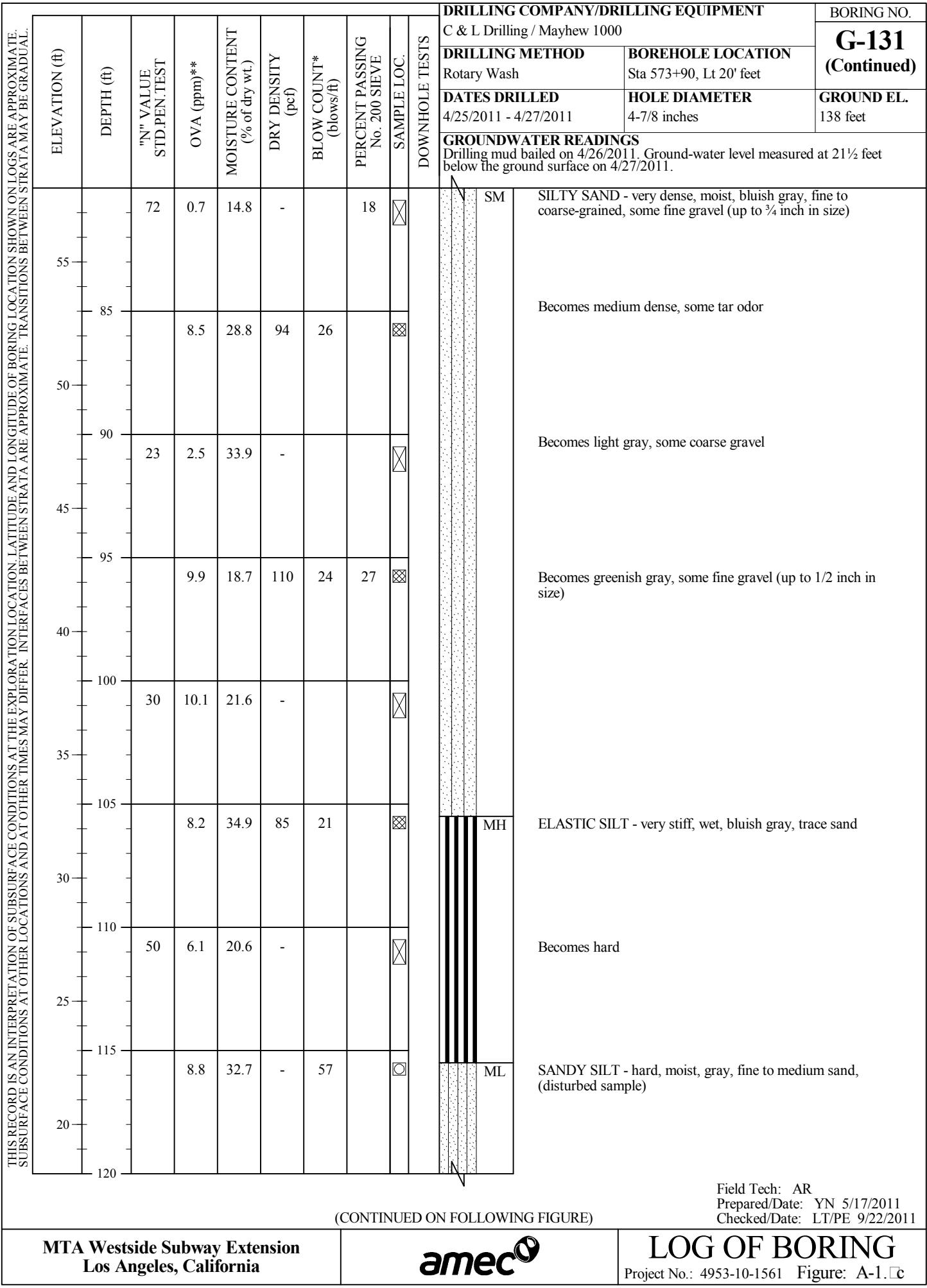
APPENDIX A

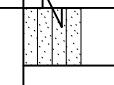
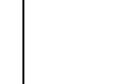
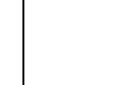
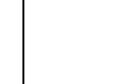
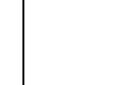
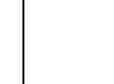
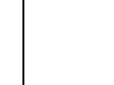
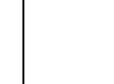
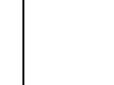
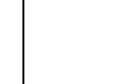
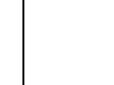
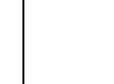
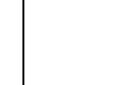
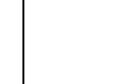
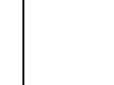
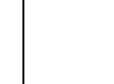
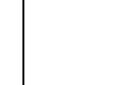
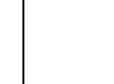
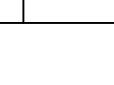
KEY TO SYMBOLS AND DESCRIPTIONS FOR GEOTECHNICAL EXPLORATION LOGS

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES		Undisturbed Sample	Auger Cuttings	Correlation of Penetration Resistance with Relative Density and Consistency (continued)					
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravels, gravel - sand mixtures, little or no fines.		X Split Spoon Sample	Bulk Sample						
			GP	Poorly graded gravels or grave - sand mixtures, little or no fines.		Rock Core	Crandall Sampler						
		GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty gravels, gravel - sand - silt mixtures.		Dilatometer	Pressuremeter						
			GC	Clayey gravels, gravel - sand - clay mixtures.		NV Noise/Vibration	No Recovery						
		CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.		▽ Water Table at time of drilling	▼ Water Table after drilling						
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 Sieve Size)		SP	Poorly graded sands or gravelly sands, little or no fines.		Correlation of Penetration Resistance with Relative Density and Consistency			<u>CRANDALL Sampler (300-lb hammer, 18-inch drop)</u> ²				
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand - silt mixtures					SAND & GRAVEL	SILT & CLAY			
			SC	Clayey sands, sand - clay mixtures.					No. of Blows	Relative Density	No. of Blows	Consistency	
			ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts and with slight plasticity.		0 - 4	Very Loose	0 - 1	Very Soft	0 - 5	Very Loose		
		SILTS AND CLAYS (Liquid limit LESS than 50)	CL	Inorganic silts of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.		5 - 10	Loose	2 - 4	Soft	6 - 11	Loose		
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit GREATER than 50)		OL	Organic silts and organic silty clays of low plasticity.		11 - 30	Medium Dense	5 - 8	Medium Stiff	12 - 32	Medium Dense		
			MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.		31 - 50	Dense	9 - 15	Stiff	33 - 53	Dense		
		SILTS AND CLAYS (Liquid limit GREATER than 50)	CH	Inorganic clays of high plasticity, fat clays		Over 50	Very Dense	16 - 30	Very Stiff	Over 53	Very Dense		
		TAR IMPACTED SOILS						Over 30	Hard		Over 32 Hard		
				<u>CRANDALL Sampler (140-lb hammer, 30-inch drop)</u> ¹				<u>CRANDALL Sampler (340-lb hammer, 18-inch drop)</u> ³					
BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.			SILT OR CLAY	SAND		GRAVEL	Cobbles	Boulders	<u>CRANDALL Sampler (140-lb hammer, 30-inch drop)</u> ¹				
				Fine	Medium	Coarse	Fine	Coarse	No. of Blows	Relative Density	No. of Blows	Consistency	
									0 - 7	Very Loose	0 - 2	Very Soft	
									8 - 16	Loose	3 - 7	Soft	
									17 - 47	Medium Dense	8 - 13	Medium Stiff	
									48 - 77	Dense	14 - 23	Stiff	
									Over 77	Very Dense	25 - 47	Very Stiff	
											Over 47	Very Dense	
											Over 29	Very Stiff	
												Hard	
NOTES: ¹ For sampling performed by Tri-County and Fugro Rigs in 2011 and C&L Rig in 2012 ² For sampling performed by C & L Rig #1 ³ For sampling performed by C & L Rig #2 prior to 3/8/2011 ⁴ For sampling performed by C & L Rig #2 after 3/8/2011													
No.200 No.40 No.10 No.4 3/4" 3" 12" U.S. STANDARD SIEVE SIZE													
Reference: The Unified Soil Classification System, Corps of Engineers, U.S. Army Technical Memorandum No. 3-357, Vol. 1, March, 1953 (Revised April, 1960)													

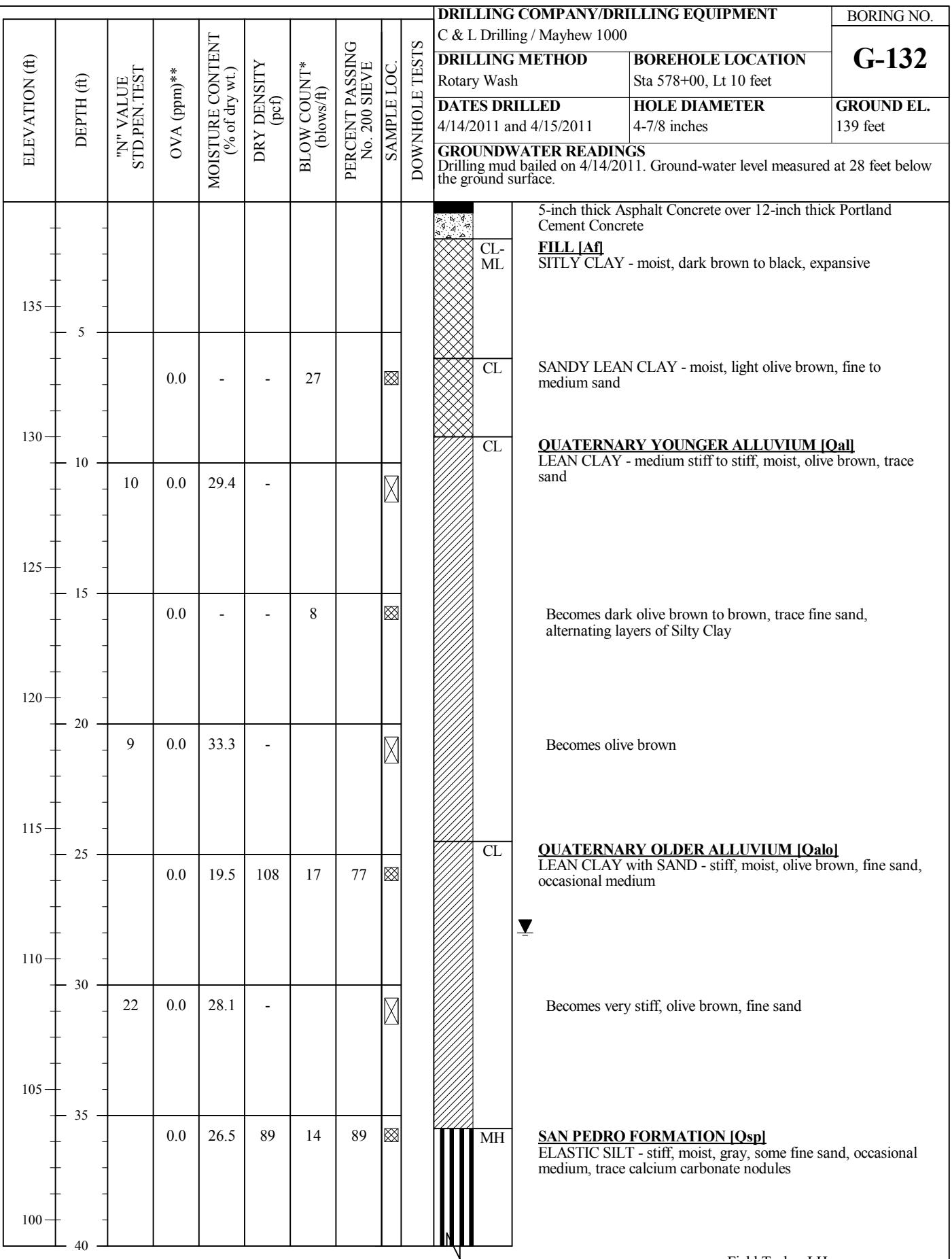






DRILLING COMPANY/DRILLING EQUIPMENT							BORING NO.				
C & L Drilling / Mayhew 1000							G-131 (Continued)				
DRILLING METHOD			BOREHOLE LOCATION								
Rotary Wash			Sta 573+90, Lt 20' feet								
DATES DRILLED			HOLE DIAMETER				GROUND EL.				
4/25/2011 - 4/27/2011			4-7/8 inches				138 feet				
GROUNDWATER READINGS Drilling mud bailed on 4/26/2011. Ground-water level measured at 21½ feet below the ground surface on 4/27/2011.											
 Becomes bluish gray END OF BORING AT 121½ FEET											
NOTES: Hand augered upper 5 feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.											
"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches											
*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches											
**Photo Ionization Detector used for OVA readings											
Downhole Test: PMT = Pressuremeter											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

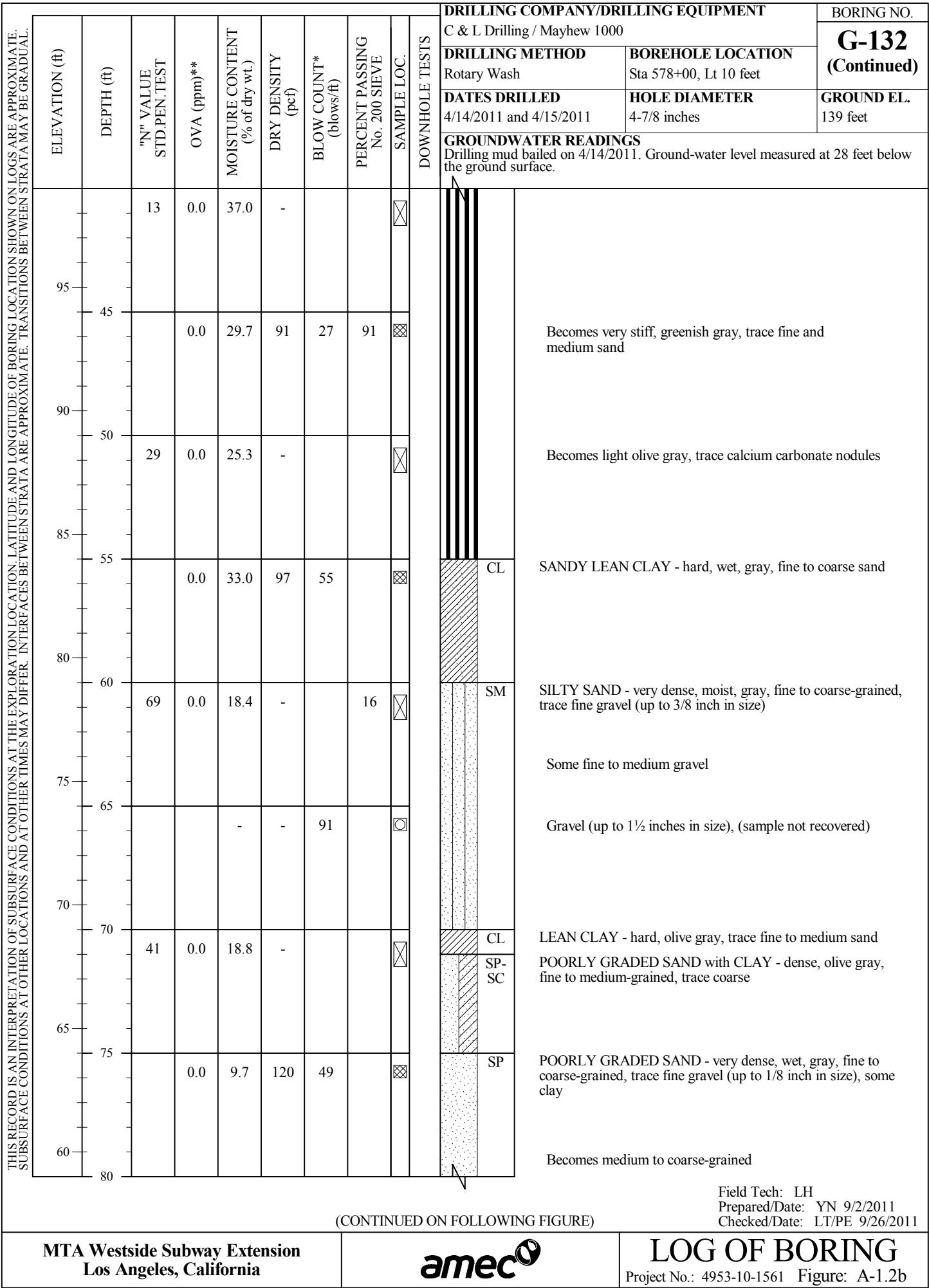


(CONTINUED ON FOLLOWING FIGURE)

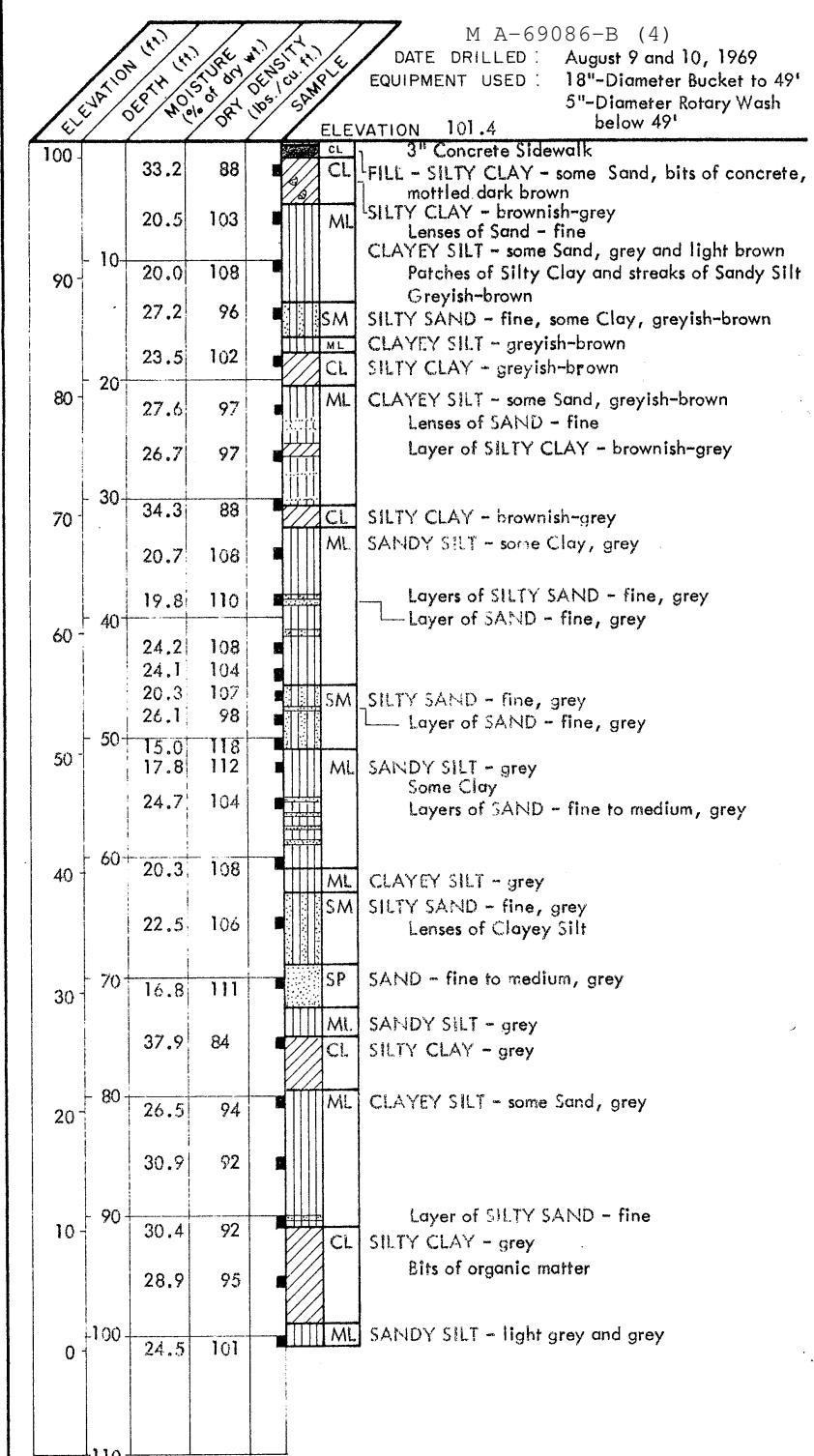
MTA Westside Subway Extension Los Angeles, California



LOG OF BORING



DRILLING COMPANY/DRILLING EQUIPMENT										BORING NO.
C & L Drilling / Mayhew 1000										G-132 (Continued)
DRILLING METHOD					BOREHOLE LOCATION					
Rotary Wash					Sta 578+00, Lt 10 feet					
DATES DRILLED					HOLE DIAMETER					GROUND EL.
4/14/2011 and 4/15/2011					4-7/8 inches					139 feet
GROUNDWATER READINGS Drilling mud bailed on 4/14/2011. Ground-water level measured at 28 feet below the ground surface.										
64	0.0	10.3	-		19	☒				CLAYEY SAND - very dense, wet, gray, fine to coarse-grained, some clay, occasional gravel (up to 1/8 inch in size) (Sample not recovered)
85	0.0	-	-	68'9"		☐				Becomes medium to coarse-grained
50	0.0	-	-	75'8"		☐				(Sample not recovered)
90	63	0.0	23.4	-	62	☒				SANDY SILT - hard, moist, gray, fine-grained
45		0.0	34.4	91	86'9"	☒				Becomes greenish gray, very fine sand
95		0.0	27.8	-	71	☒				LEAN CLAY with SAND - hard, moist, gray, fine sand, trace medium
40	42	0.0	20.0	107	46	☒				Becomes light gray, trace calcium carbonate nodules
35		0.0	16.8	-		☒				CLAYEY SAND - very dense, moist, light olive gray, fine to medium-grained
30	65	0.0								END OF BORING AT 111½ FEET NOTES: Hand augered upper 5½ feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.
25										"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches
20										*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches
120										**Photo Ionization Detector used for OVA readings
MTA Westside Subway Extension Los Angeles, California								LOG OF BORING Project No.: 4953-10-1561 Figure: A-1.2c		



JOB A-69086-B-13 DATE 8-30-61 C U M O E

NOTE: Water seepage encountered and sloughing at depths of 17 $\frac{1}{2}$ ', 23 $\frac{1}{2}$ ', 29 $\frac{1}{2}$ ', 39', 41' and 47 $\frac{1}{2}$ ' in the bucket hole. Drilling mud used in the rotary wash hole.

LOG OF BORING

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS <small>(More than 50% of material is LARGER than No. 200 sieve size)</small>	GRAVELS <small>(More than 50% of coarse fraction is LARGER than the No. 4 sieve size)</small>	CLEAN GRAVELS <small>(Little or no fines)</small>	GW GP	Well graded gravels, gravel-sand mixtures, little or no fines. Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES <small>(Appreciable amt. of fines)</small>	GM GC	Silty gravels, gravel-sand-silt mixtures. Clayey gravels, gravel-sand-clay mixtures.
		CLEAN SANDS <small>(Little or no fines)</small>	SW SP	Well graded sands, gravelly sands, little or no fines. Poorly graded sands or gravelly sands, little or no fines.
		SANDS <small>(More than 50% of coarse fraction is SMALLER than the No. 4 sieve size)</small>	SM SC	Silty sands, sand-silt mixtures. Clayey sands, sand-clay mixtures.
		SILTS AND CLAYS <small>(Liquid limit LESS than 50)</small>	ML CL	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity. Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
	FINE GRAINED SOILS <small>(More than 50% of material is SMALLER than No. 200 sieve size)</small>	OL	Organic silts and organic silty clays of low plasticity.	
		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.	
		CH	Inorganic clays of high plasticity, fat clays.	
		OH	Organic clays of medium to high plasticity, organic silts.	
		Pt	Peat and other highly organic soils.	

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

SILT OR CLAY	PARTICLE SIZE			LIMITS		
	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	
NO. 200	NO. 40	NO. 10	NO. 4	3/4 in.	3 in.	(12 in.)
U. S. STANDARD				SIEVE	SIZE	

UNIFIED SOIL CLASSIFICATION SYSTEM

Reference:
The Unified Soil Classification System, Corps of Engineers, U. S. Army Technical Memorandum No. 3-357, Vol. I, March, 1953. (Revised April, 1960)

LEROY CRANDALL & ASSOCIATES

M A-78304 (4)

DATE DRILLED: October 13, 1978

EQUIPMENT USED: 20"-Diameter Bucket

ELEVATION 100.7

ELEVATION (ft)	DEPTH (ft)	"N" VALUE	STD. PEN. TEST	MOISTURE (%) of dry wt.	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft-kips/ft.)	SAMPLE LOC.
100							
95	5	34.6 36.0	86 82	2 3			CL
90	10	34.3 33.9	86 85	6 3			ML
85	15	7.3	105	3			SW
80	20	24.4	101	2			ML

3" Asphaltic Paving with 3" Sand and gravel base
FILL - SILT and CLAY - mottled brown and grey
SILTY CLAY - mottled grey

CLAYEY SILT - grey
SAND - well graded, grey
SANDY SILT - petroleum odor, grey
Grading Clayey

NOTE: Water not encountered. No caving.

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

JOB A-78304 DATE 10-13-78 DR. 25 O.E.T F W.P. CW CHKD PM

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

Figure A-1.3.3

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravels, gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amt. of fines)	GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amt. of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size)	CLEAN SANDS (Little or no fines)	GC	Clayey gravels, gravel-sand-clay mixtures.
		CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.
		CLEAN SANDS (Little or no fines)	SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amt. of fines)	SM	Silty sands, sand-silt mixtures.
		SANDS WITH FINES (Appreciable amt. of fines)	SC	Clayey sands, sand-clay mixtures.
	FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
		SILTS AND CLAYS (Liquid limit LESS than 50)	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		SILTS AND CLAYS (Liquid limit LESS than 50)	OL	Organic silts and organic silty clays of low plasticity.
		SILTS AND CLAYS (Liquid limit GREATER than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
		SILTS AND CLAYS (Liquid limit GREATER than 50)	CH	Inorganic clays of high plasticity, fat clays.
		SILTS AND CLAYS (Liquid limit GREATER than 50)	OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

SILT OR CLAY	PARTICLE SIZE			LIMITS		
	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	
NO. 200	NO. 40	NO. 10	NO. 4	3/4 in.	3 in.	(12 in.)
U. S. STANDARD				SIEVE	SIZE	

UNIFIED SOIL CLASSIFICATION SYSTEM

Reference:
The Unified Soil Classification System, Corps of Engineers, U. S. Army Technical Memorandum No. 3-357, Vol. I, March, 1953. (Revised April, 1960)

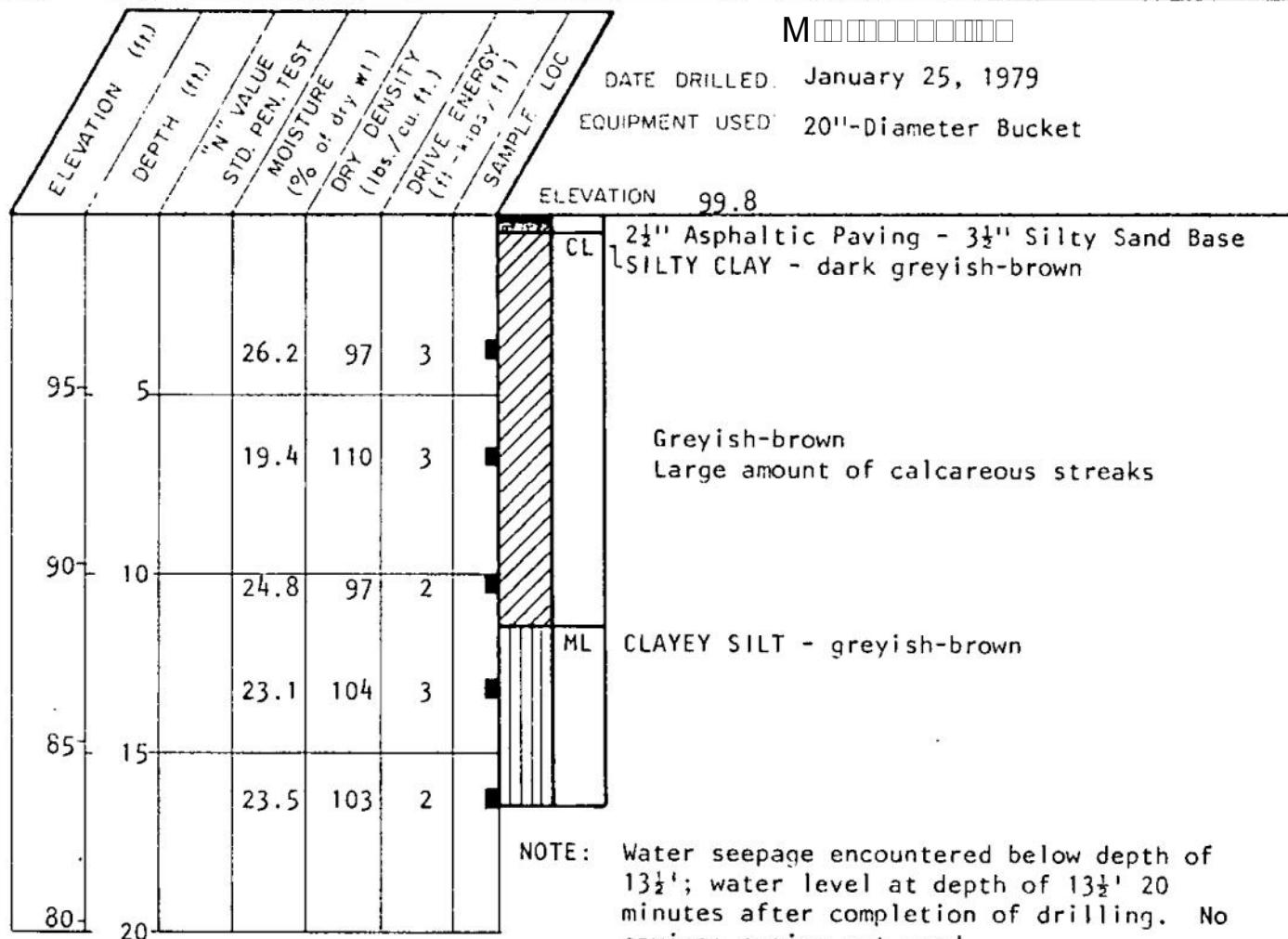
LEROY CRANDALL & ASSOCIATES

M□□□□□□□□□

DATE DRILLED: January 25, 1979

EQUIPMENT USED: 20"-Diameter Bucket

ELEVATION 99.8

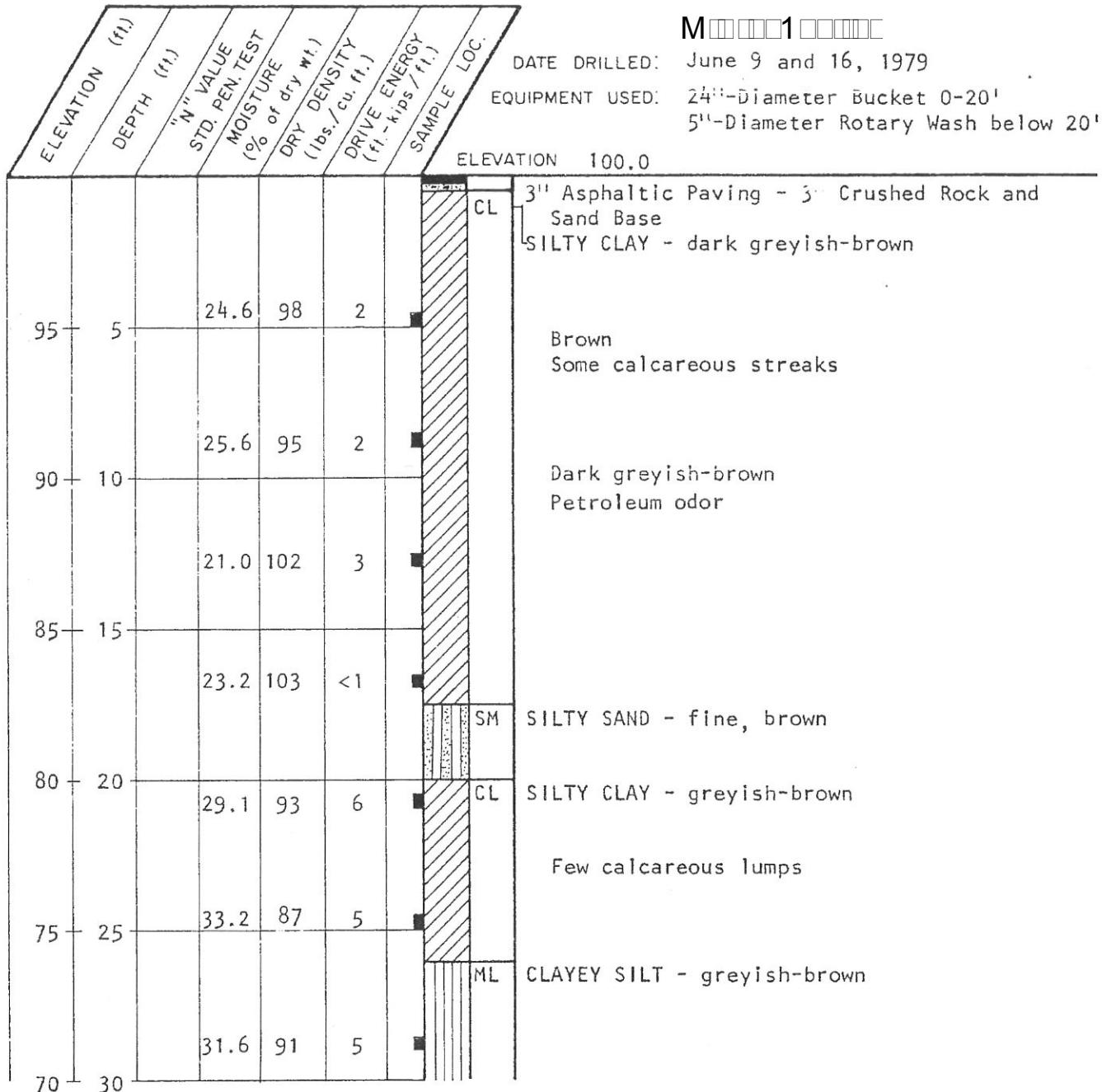


LOG OF BORING

LEROY CRANDALL AND ASSOCIATES

JOB A-79162 DATE 6-26-79 DR Team NE W.P. $\frac{1}{2}$ CHKO $\frac{1}{2}$

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.



(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

Figure A-1.3.6

JOB A-79162 DATE 6-26-79 DR. Kamm C.E. D.A. W.P. ✓ CHKD ✓

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

ELEVATION (ft.)	DEPTH (ft.)	"N" STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.
65	35	18.8	112	8		CL
60	40	13.7	121	17		SM
55	45	22.6	105	10		ML
50	50	25.3	100	19		SW
45	55					
60						

NOTE:

Water seepage encountered below 14.7'. Drilling mud used in drilling process of rotary wash hole.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

Figure A-1.3.7

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS <small>(More than 50% of material is LARGER than No. 200 sieve size)</small>	GRAVELS <small>(More than 50% of coarse fraction is LARGER than the No. 4 sieve size)</small>	CLEAN GRAVELS <small>(Little or no fines)</small>	GW	Well graded gravels, gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES <small>(Appreciable amt. of fines)</small>	GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES <small>(Appreciable amt. of fines)</small>	GM	Silty gravels, gravel-sand-silt mixtures.
		CLEAN SANDS <small>(Little or no fines)</small>	GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS <small>(More than 50% of coarse fraction is SMALLER than the No. 4 sieve size)</small>	CLEAN SANDS <small>(Little or no fines)</small>	SW	Well graded sands, gravelly sands, little or no fines.
		SANDS WITH FINES <small>(Appreciable amt. of fines)</small>	SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES <small>(Appreciable amt. of fines)</small>	SM	Silty sands, sand-silt mixtures.
		SANDS WITH FINES <small>(Appreciable amt. of fines)</small>	SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS <small>(More than 50% of material is SMALLER than No. 200 sieve size)</small>	SILTS AND CLAYS <small>(Liquid limit LESS than 50)</small>			ML Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
	SILTS AND CLAYS <small>(Liquid limit LESS than 50)</small>			CL Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
	SILTS AND CLAYS <small>(Liquid limit LESS than 50)</small>			OL Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS <small>(Liquid limit GREATER than 50)</small>			MH Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
	SILTS AND CLAYS <small>(Liquid limit GREATER than 50)</small>			CH Inorganic clays of high plasticity, fat clays.
	SILTS AND CLAYS <small>(Liquid limit GREATER than 50)</small>			OH Organic clays of medium to high plasticity, organic silts.
	HIGHLY ORGANIC SOILS			Pt Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

SILT OR CLAY	PARTICLE SIZE			LIMITS			
	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
NO. 200	NO. 40	NO. 10	NO. 4	3/4 in. SIEVE	3 in. SIZE	(12 in.)	
U. S. STANDARD							

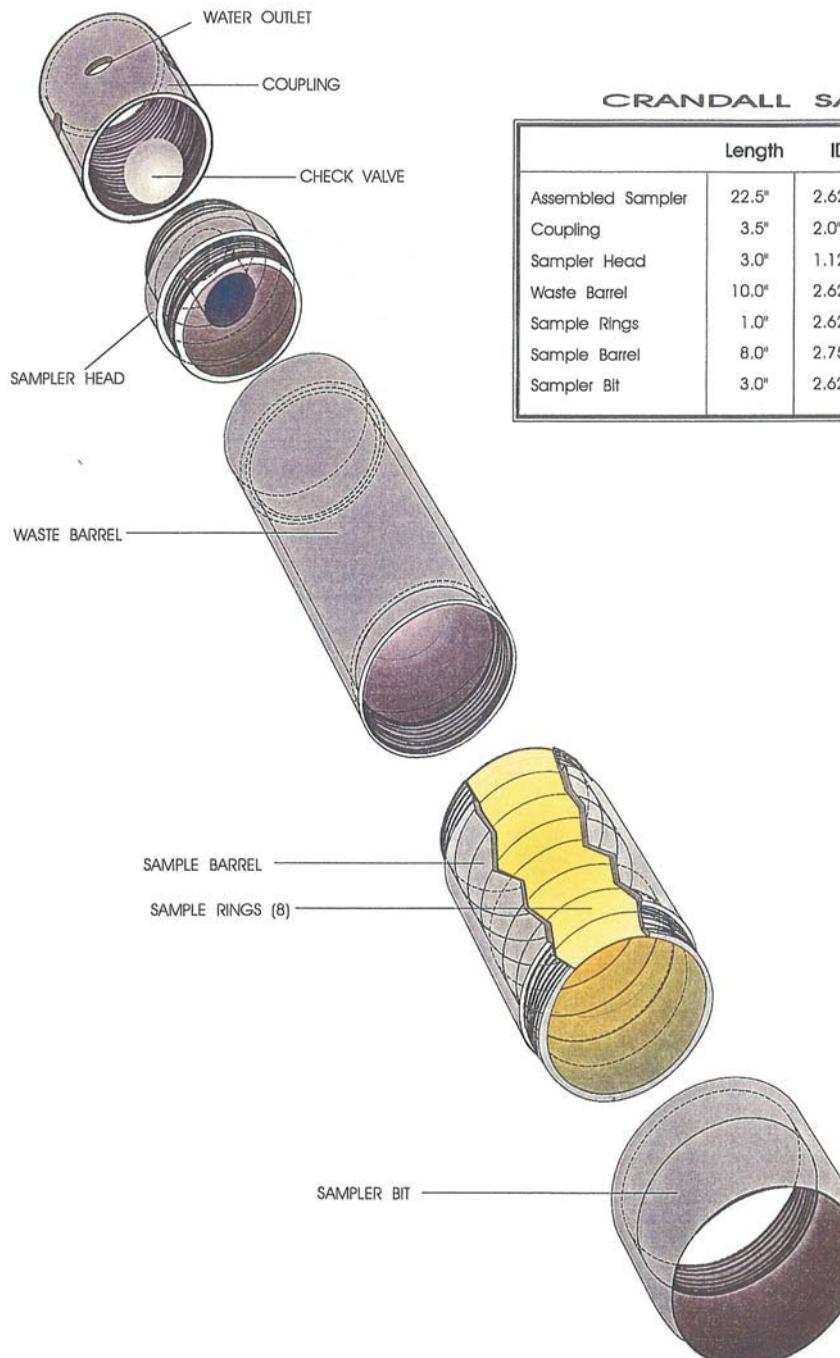
UNIFIED SOIL CLASSIFICATION SYSTEM

Reference :

The Unified Soil Classification System, Corps of Engineers, U.S. Army Technical Memorandum No. 3-357, Vol. I, March, 1953. (Revised April, 1960)

LEROY CRANDALL & ASSOCIATES

CRANDALL SAMPLER



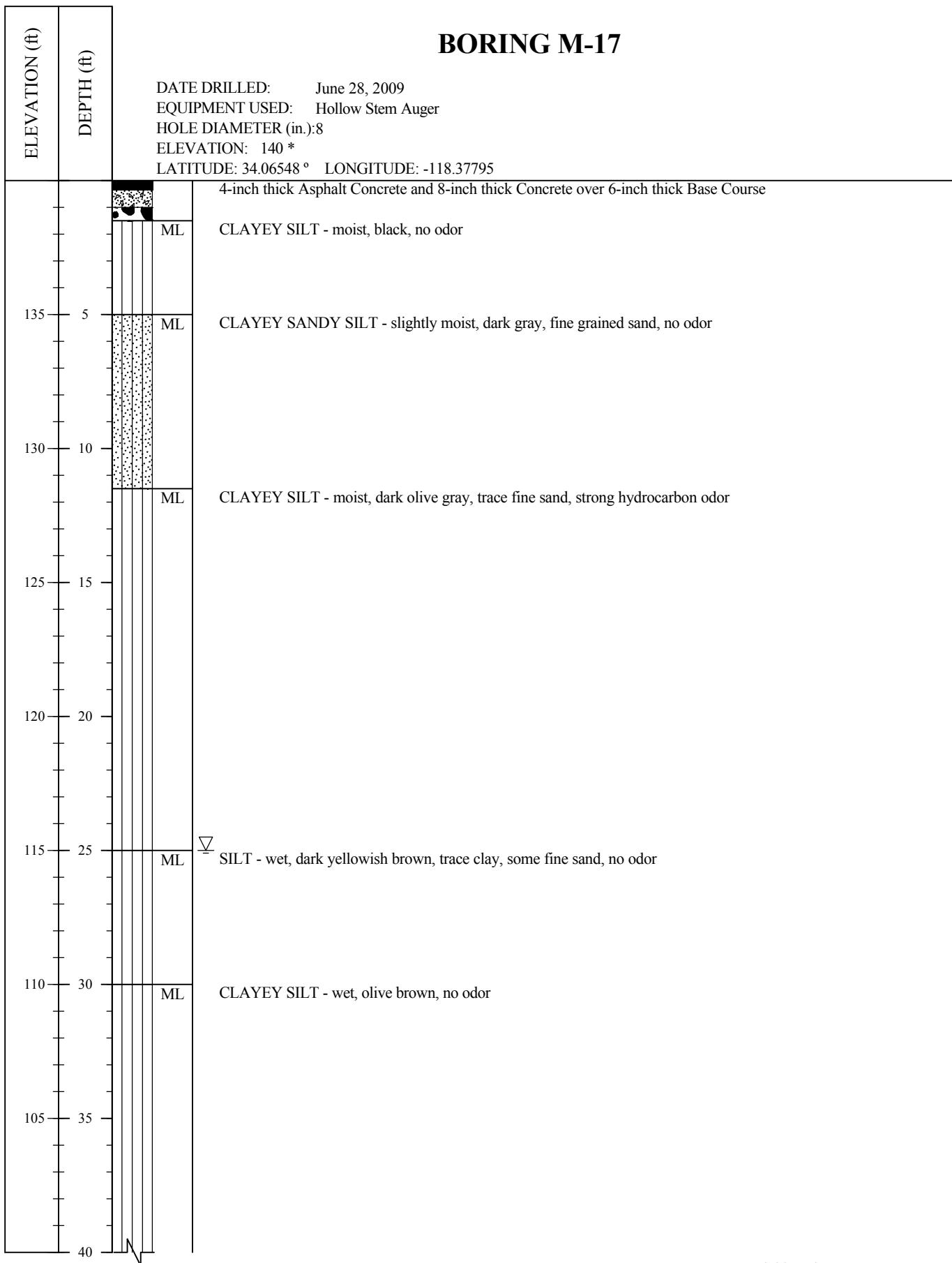
CRANDALL SAMPLER

	Length	ID	OD
Assembled Sampler	22.5"	2.625"	3.187"
Coupling	3.5"	2.0"	3.0"
Sampler Head	3.0"	1.125"	3.125"
Waste Barrel	10.0"	2.625"	3.125"
Sample Rings	1.0"	2.625"	2.750"
Sample Barrel	8.0"	2.750"	3.125"
Sampler Bit	3.0"	2.625"	3.187"

Corel Draw • Drawn by Juliana M • Date August 7, 1995

 AMEC ENVIRONMENT & INFRASTRUCTURE 5628 E. SLAUSON AVE. • LOS ANGELES, CALIFORNIA 90040 (323) 889-5300 • fax (323) 889-5398	
FIGURE A-1.4 - Crandall Sampler	
JOB NO.: 4953-11-1421	REVISIONS:
DATE: 12-11-09	
SCALE:	
DRAWN BY: NH	
CHECKED BY: MKT	

ENVIRONMENTAL (EMPTY W/ISCS) S:7013 GEOTECHNICAL LIBRARY MACTEC JUNE2011 GLB
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 THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS
 AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.



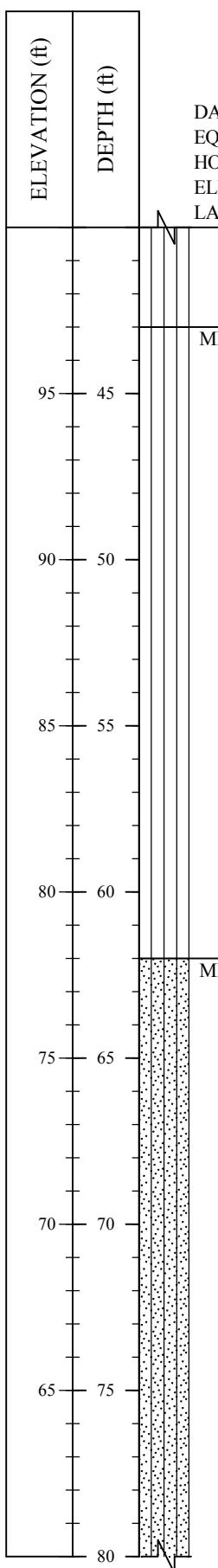
(CONTINUED ON FOLLOWING FIGURE)

Field Tech: PK
Prepared By: NH
Checked By:

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 THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS
 AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

BORING M-17 (Continued)

DATE DRILLED: June 28, 2009
 EQUIPMENT USED: Hollow Stem Auger
 HOLE DIAMETER (in.): 8
 ELEVATION: 140 *
 LATITUDE: 34.06548 ° LONGITUDE: -118.37795

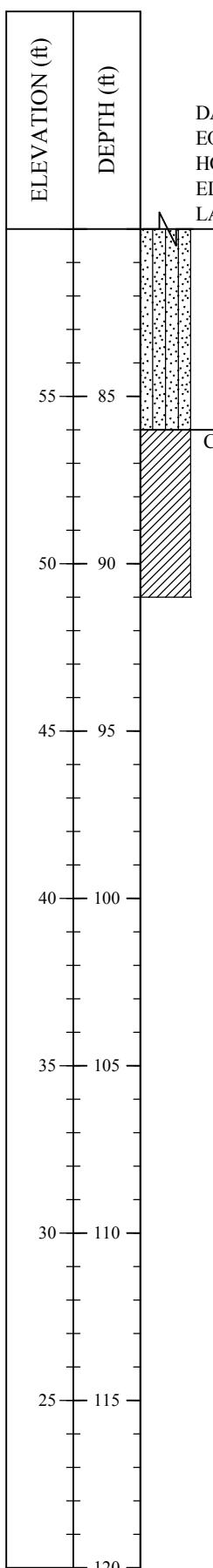


(CONTINUED ON FOLLOWING FIGURE)

Field Tech: PK
 Prepared By: NH
 Checked By:

BORING M-17 (Continued)

DATE DRILLED: June 28, 2009
 EQUIPMENT USED: Hollow Stem Auger
 HOLE DIAMETER (in.):8
 ELEVATION: 140 *
 LATITUDE: 34.06548 ° LONGITUDE: -118.37795



LEAN CLAY - wet, dark greenish gray

END OF BORING AT 91 FEET

NOTES:

Soil logged from cuttings only.

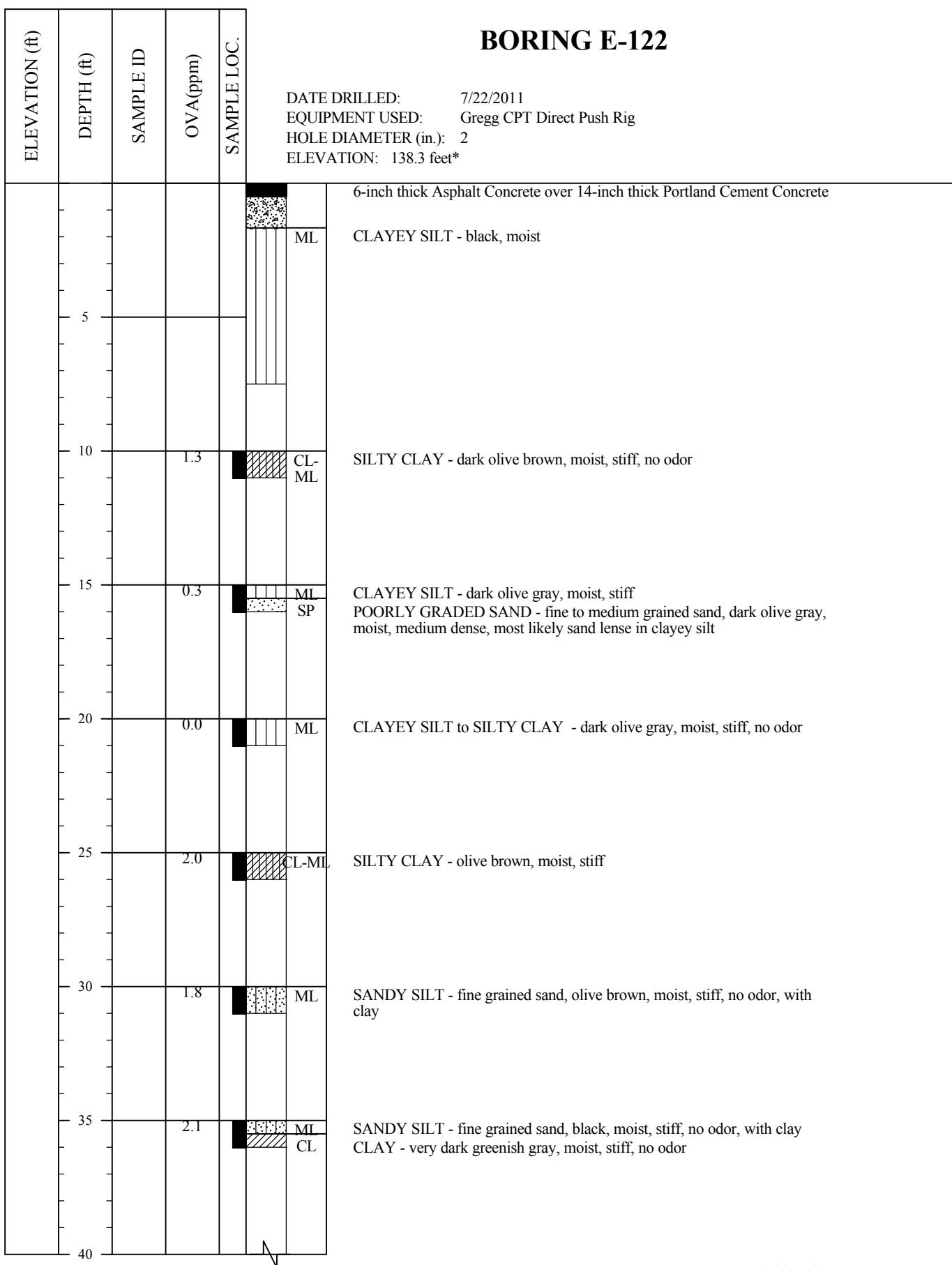
Ground water encountered at 25 feet.

Installed nested soil vapor probes at 15 feet (green), 25 feet (red), 65 feet (blue), and 90 feet (yellow). See well construction diagram for M-17.

Field Tech: PK
 Prepared By: NH
 Checked By:

BORING E-122

DATE DRILLED: 7/22/2011
 EQUIPMENT USED: Gregg CPT Direct Push Rig
 HOLE DIAMETER (in.): 2
 ELEVATION: 138.3 feet*

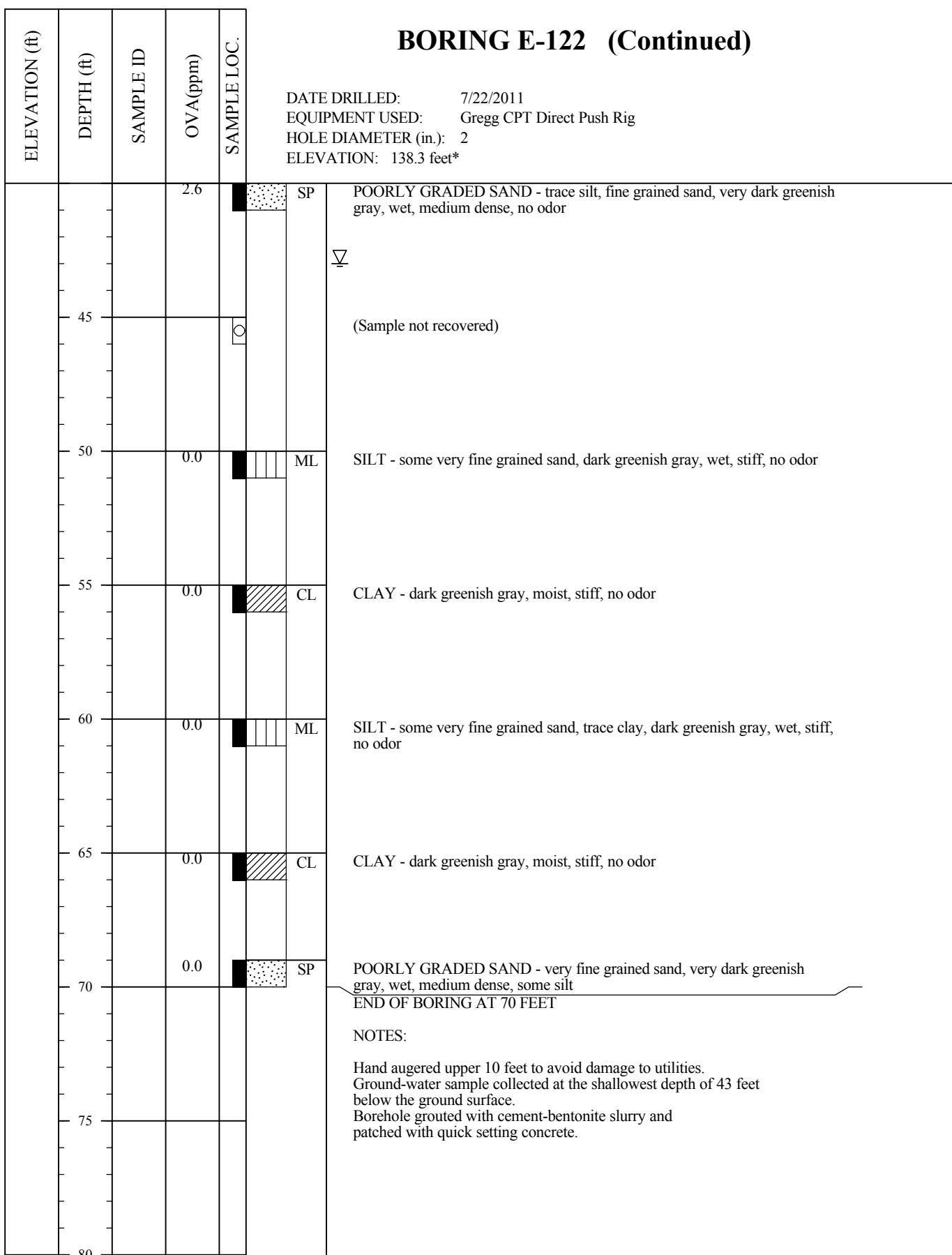


(CONTINUED ON FOLLOWING FIGURE)

Field Tech: PK
 Prepared By: LH/APR/YN
 Checked By: DC

BORING E-122 (Continued)

DATE DRILLED: 7/22/2011
 EQUIPMENT USED: Gregg CPT Direct Push Rig
 HOLE DIAMETER (in.): 2
 ELEVATION: 138.3 feet*



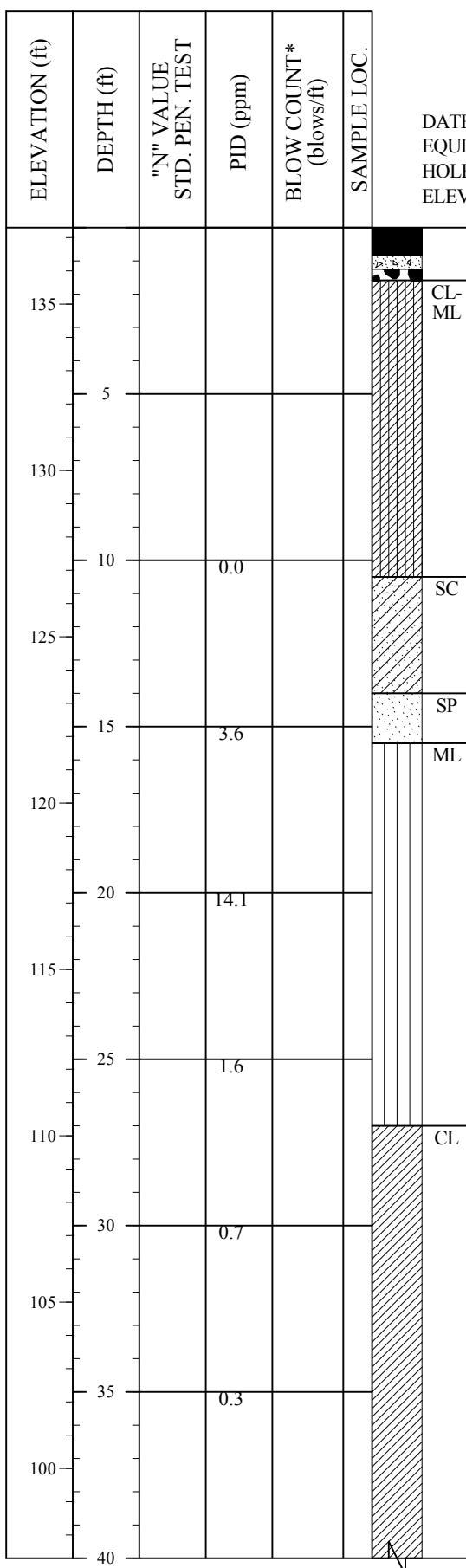
NOTES:

Hand augered upper 10 feet to avoid damage to utilities.
 Ground-water sample collected at the shallowest depth of 43 feet below the ground surface.
 Borehole grouted with cement-bentonite slurry and patched with quick setting concrete.

Field Tech: PK
 Prepared By: LH/APR/YN
 Checked By: DC

BORING E-122A

DATE DRILLED: June 26, 2012
 EQUIPMENT USED: CME 75
 HOLE DIAMETER (in.): 8
 ELEVATION: 137**



(CONTINUED ON FOLLOWING FIGURE)

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 THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

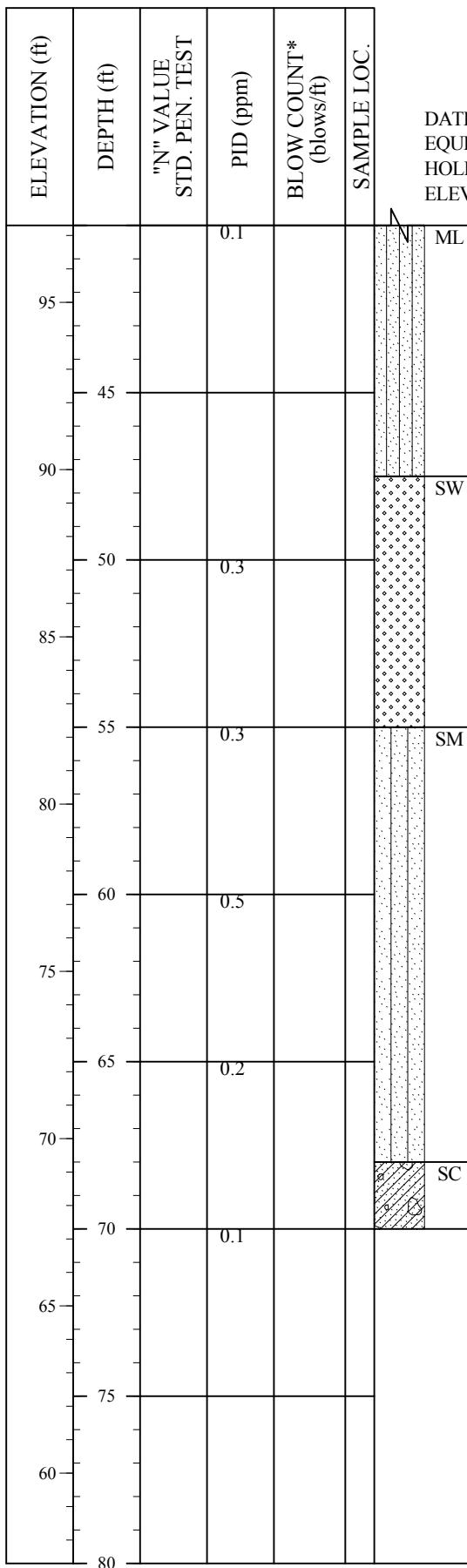
Field Tech: PK
 Prepared By: PWK/LH
 Checked By: PK

MTA Westside Subway Extension
 Los Angeles, California



LOG OF BORING
 Project: 4953-11-1421 Figure: A-□□2a

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 THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.



BORING E-122A (Continued)

DATE DRILLED: June 26, 2012
 EQUIPMENT USED: CME 75
 HOLE DIAMETER (in.): 8
 ELEVATION: 137**

▼ WELL GRADED SAND - wet, greenish gray (GLEY1 4/1), fine to coarse-grained

SILTY SAND - moist, greenish gray (GLEY1 4/2), fine grained

Becomes wet

Becomes very dark greenish gray (GLEY1 3/1), some clay

CLAYEY SAND with GRAVEL - moist, dark greenish gray (GLEY1 4/1)

END OF BORING AT 70 FEET

NOTES:

Hand augered upper 5 feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

Groundwater was encountered at approximately 46 feet below ground surface (bgs) at the time of drilling. Borehole caved to approximately 64 feet bgs after drilling.

One groundwater monitoring well was installed with screen depths at 43 to 63 feet bgs. Groundwater was measured at 28.2 feet bgs in the monitoring well on 6/28/2012.

Two methane gas probes were installed at 15 and 25 feet bgs.

**Elevations based on topographic map provided by PB on 8/22/2012

Field Tech: PK
 Prepared By: PWK/LH
 Checked By: PK

APPENDIX B



CPT DATA

Job Number 04.0912-0024

CPT Number C-303

Location Los Angeles, CA

Operator Daniel Garza

Date and Tin 15-May-2012 22:08:59

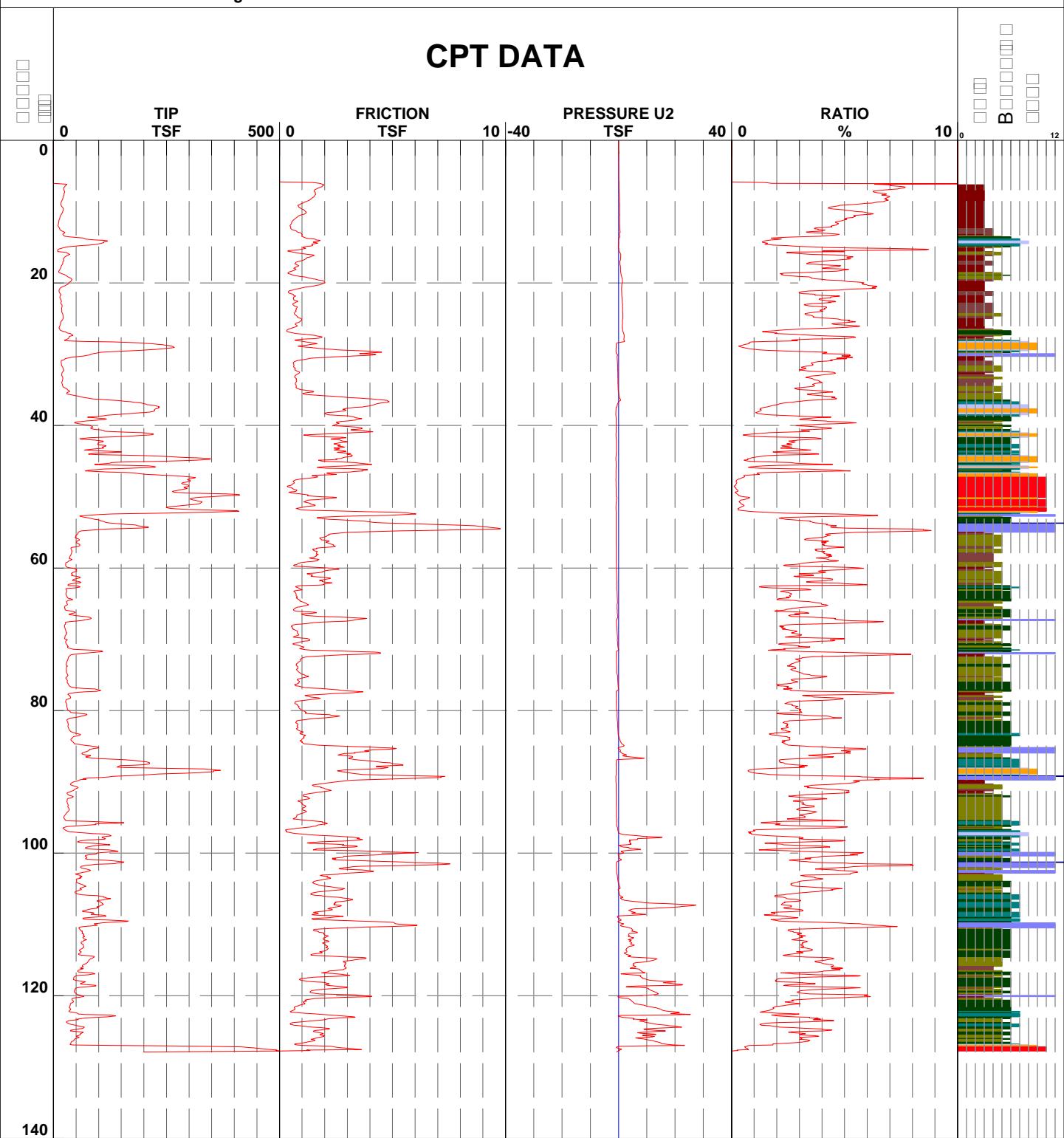
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Client

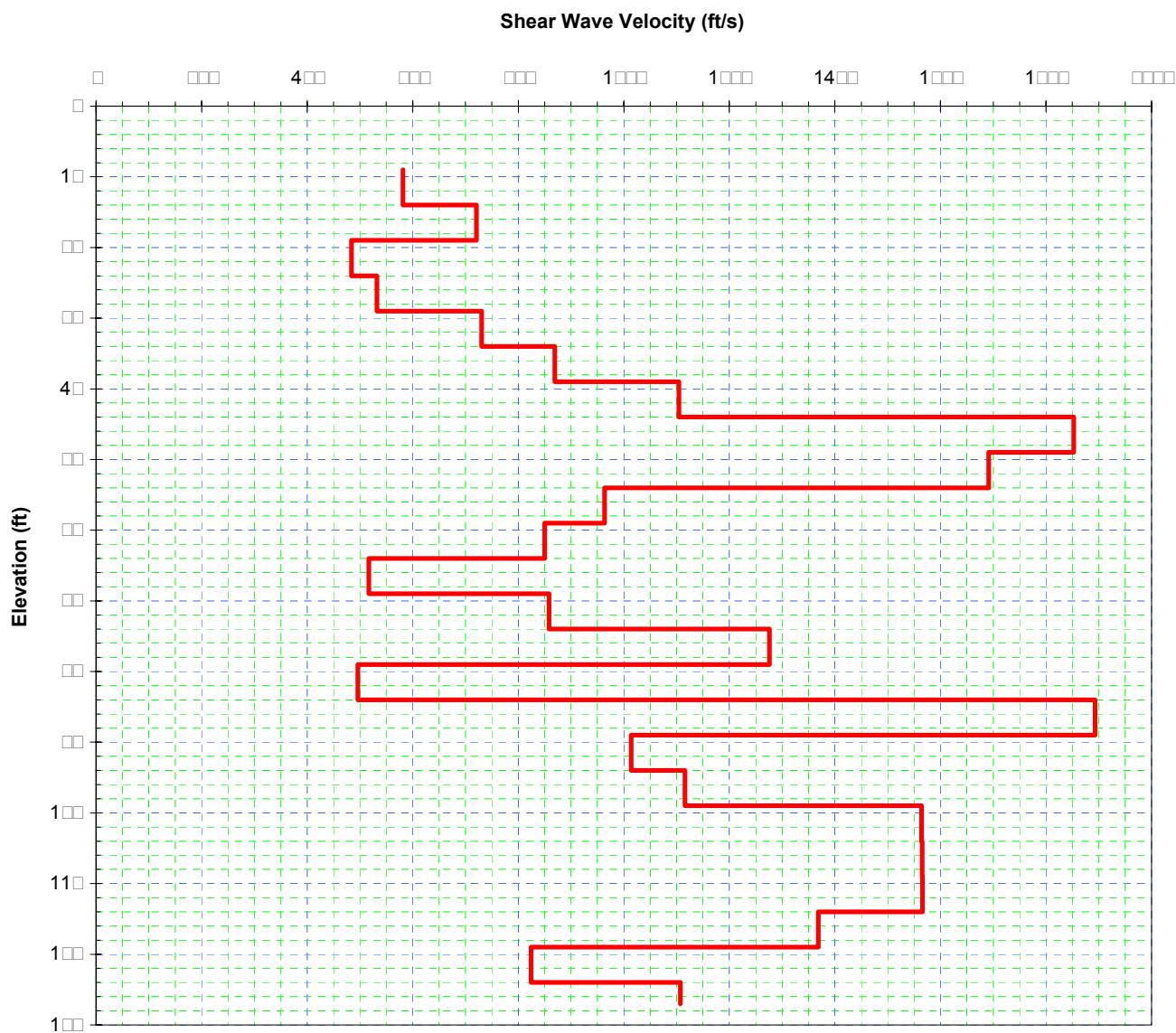
AMEC

8' augered

CPT DATA



1 - sensitive fine grained 4 - silty clay to clay 7 - silty sand to sandy silt 10 - gravelly sand to sand
2 - organic material 5 - clayey silt to silty clay 8 - sand to silty sand 11 - very stiff fine grained (*)
3 - clay 6 - sandy silt to clayey silt 9 - sand 12 - sand to clayey sand (*)

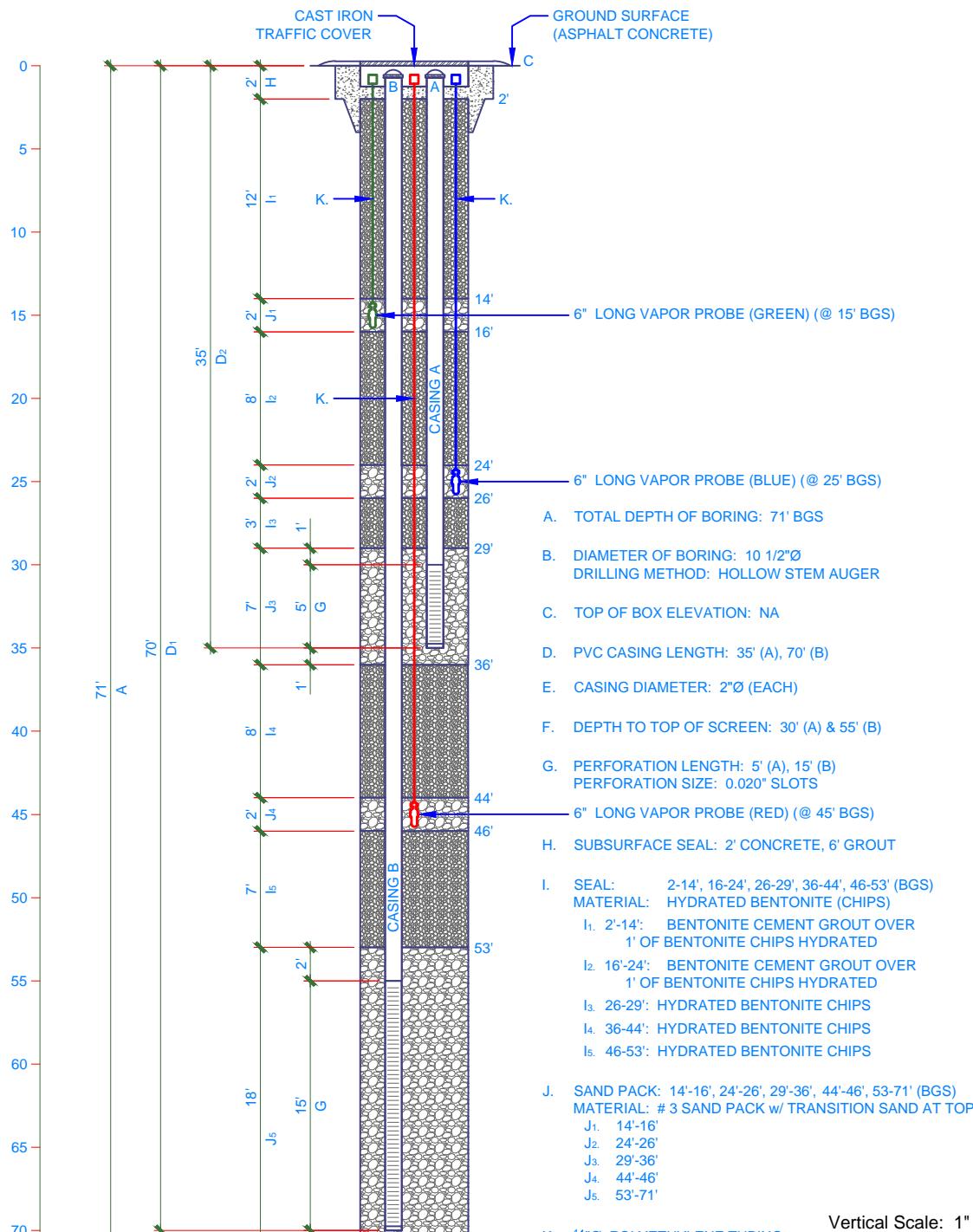


**AMEC - Los Angeles, CA
SC-303**



APPENDIX C

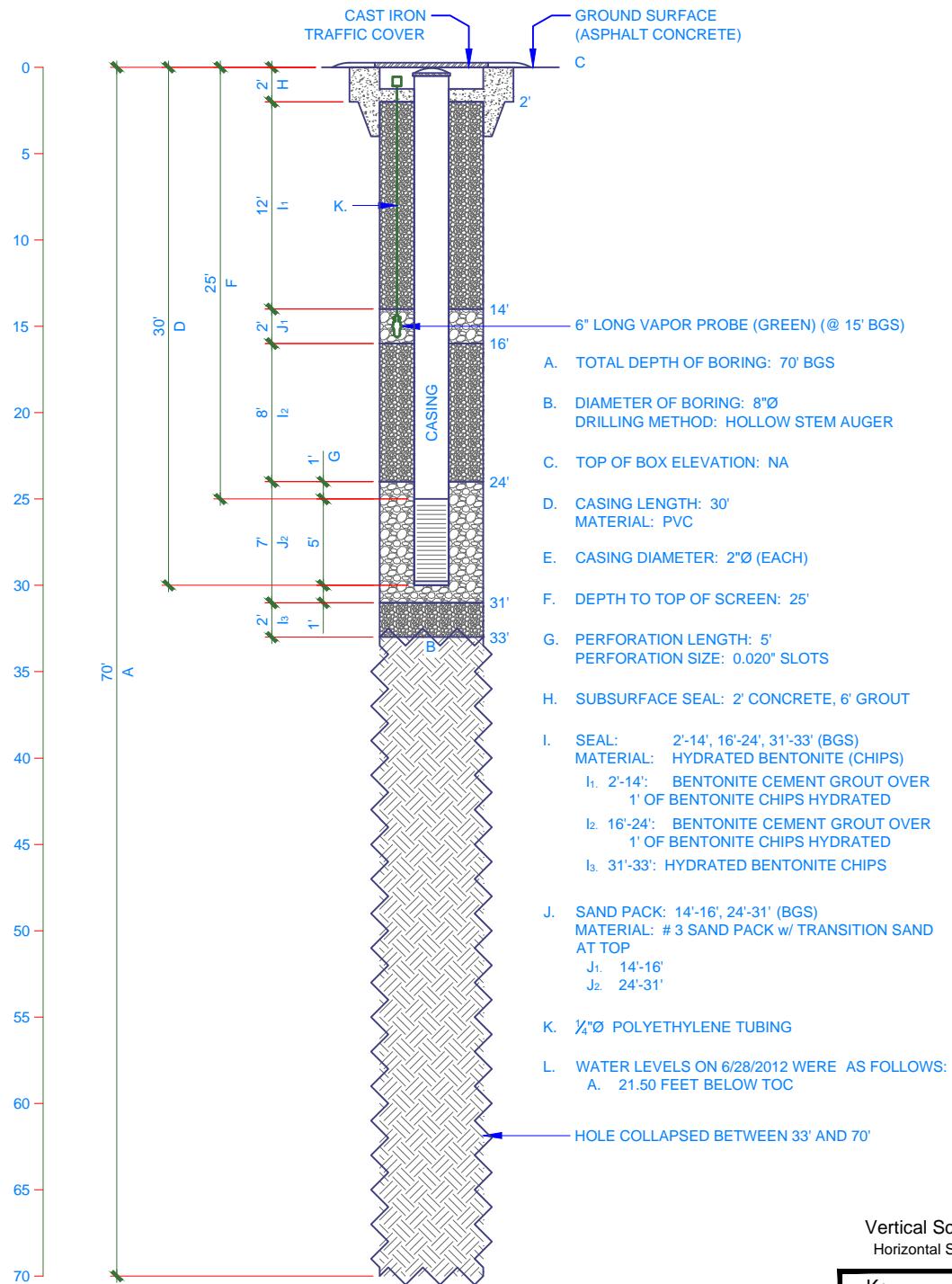
SOIL GAS / GROUNDWATER MONITORING WELL E-120A



Key	
BGS	Below Ground Surface
TOC	Top Of Casing
'	Feet
"	Inches

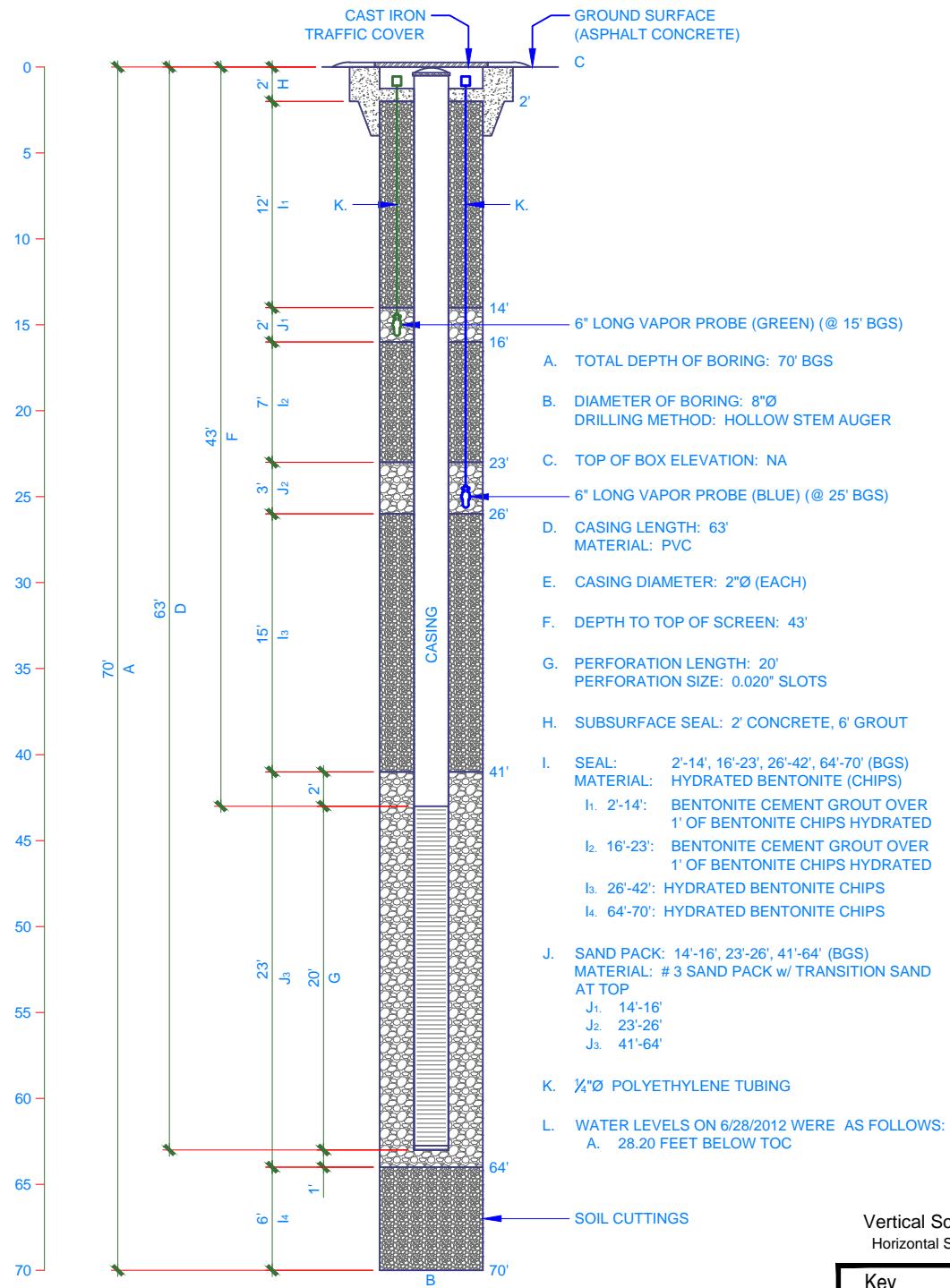
<p>AMEC Environment & Infrastructure 6001 Rickenbacker Road, Los Angeles, California 90040 Phone (323) 889-5300 Fax (323) 721-6700</p>	WELL NO.:	E-120A	DRAWN:	L. Morley	<p>MTA WESTSIDE EXTENSION Parsons Brinckerhoff</p> <p>WELL CONSTRUCTION DETAIL Soil Gas / Groundwater Monitoring Well</p>	WELL NO.	C-1.1
	INSTALLED:	06/21/2012	CHKD:	Jag / L.H.		PROJECT NO.	4953-11-1421
	SCALE:	1" = 10' Vertical	DATE:	01/03/2013			
	DRILL CO.:	Martini Drilling	TECHNIQUE:	Hollow Stem			
	FIELD PERSONNEL:	Paul Kane					
	PROJECT NAME:	MTA Westside Subway Extension					
	WELL LOCATION:	Wilshire & S. Tower Dr., Los Angeles, CA					

SOIL GAS / GROUNDWATER MONITORING WELL E-121A



WELL NO.: E-121A INSTALLED: 06/22/2012 SCALE: 1" = 10' Vertical DRILL CO.: Martini Drilling FIELD PERSONNEL: Paul Kane PROJECT NAME: MTA Westside Subway Extension WELL LOCATION: Wilshire, E of S Hamilton Dr., Los Angeles, CA	MTA WESTSIDE EXTENSION Parsons Brinckerhoff WELL CONSTRUCTION DETAIL Soil Gas / Groundwater Monitoring Well	WELL NO. C-1.2 PROJECT NO. 4953-11-1421

SOIL GAS / GROUNDWATER MONITORING WELL E-122A



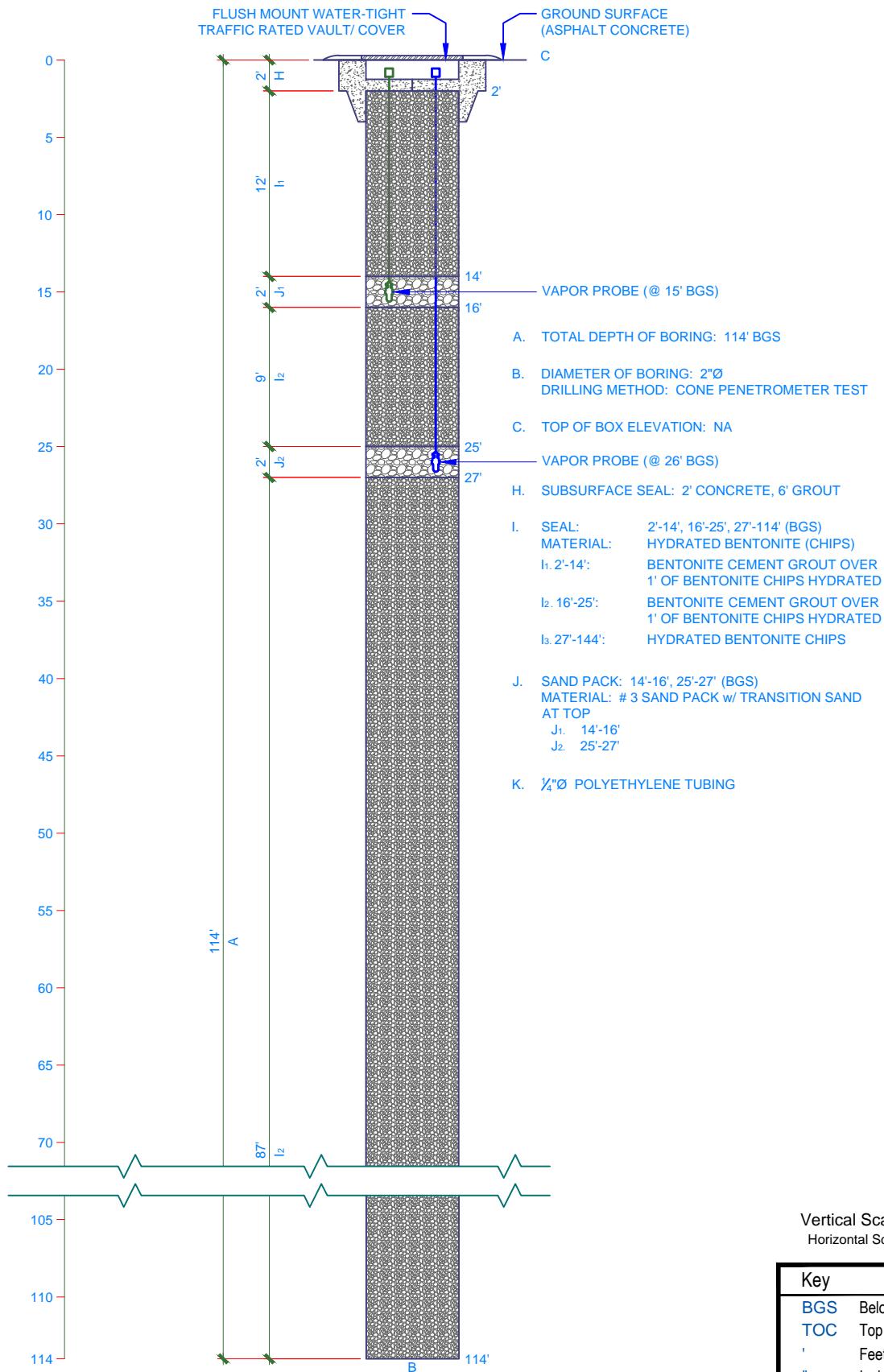
amec	WELL NO.: E-122A	DRAWN: L. Morley
INSTALLED: 06/26/2012	CHKD: Jag / L.H.	
SCALE: 1" = 10' Vertical	DATE: 01/03/2013	
DRILL CO.: Martini Drilling	TECHNIQUE: Hollow Stem	
FIELD PERSONNEL: Paul Kane		
PROJECT NAME: MTA Westside Subway Extension		
WELL LOCATION: Wilshire & La Cienega, Los Angeles, CA		

WELL NO.:	E-122A	DRAWN:	L. Morley
INSTALLED:	06/26/2012	CHKD:	Jag / L.H.
SCALE:	1" = 10' Vertical	DATE:	01/03/2013
DRILL CO.:	Martini Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Paul Kane		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Wilshire & La Cienega, Los Angeles, CA		

WELL CONSTRUCTION DETAIL	WELL NO.
Soil Gas / Groundwater Monitoring Well	C-1.3

PROJECT NO.
4953-11-1421

SOIL GAS MONITORING WELL C-302



AMEC
Environment & Infrastructure, Inc.
5628 E. Slauson Avenue, Los Angeles, California 90040
Phone (323) 889-5300 Fax (323) 889-5398

WELL NO.:	C-302	DRAWN:	L. Morley
INSTALLED:	05/11/2012	CHKD:	Jag
SCALE:	1" = 10' Vertical	DATE:	08/23/2012
DRILL CO.:	Fugro	TECHNIQUE:	CPT
FIELD PERSONNEL:			Paul Kane
PROJECT NAME:			MTA Westside Subway Extension
WELL LOCATION:			Wilshire & S. Tower Dr., Los Angeles, CA

MTA WESTSIDE EXTENSION

Parsons Brinckerhoff

WELL CONSTRUCTION DETAIL
Soil Gas / Groundwater Monitoring Well

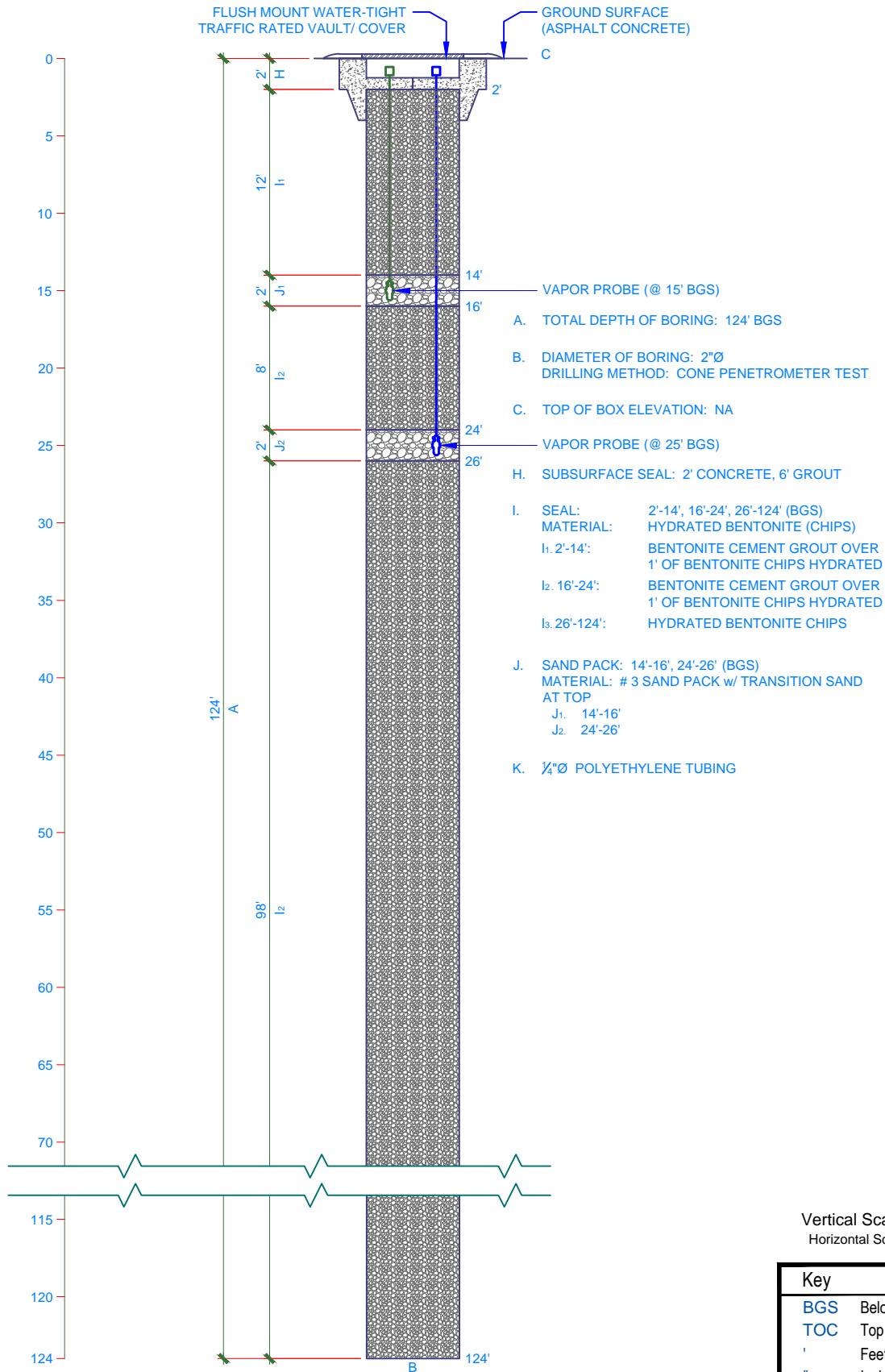
FIGURE NO.

C-1.4

PROJECT NO.

4953-11-1421

SOIL GAS MONITORING WELL C-303



AMEC
Environment & Infrastructure, Inc.
5628 E. Slauson Avenue, Los Angeles, California 90040
Phone (323) 889-5300 Fax (323) 889-5398

WELL NO.:	C-303	DRAWN:	L. Morley
INSTALLED:	05/11/2012	CHKD:	Jag
SCALE:	1" = 10' Vertical	DATE:	08/23/2012
DRILL CO.:	Fugro	TECHNIQUE:	CPT
FIELD PERSONNEL:	Paul Kane		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Wilshire & La Cienega, Los Angeles, CA		

MTA WESTSIDE EXTENSION

Parsons Brinckerhoff

WELL CONSTRUCTION DETAIL
Soil Gas / Groundwater Monitoring Well

FIGURE NO.

C-1.5

PROJECT NO.

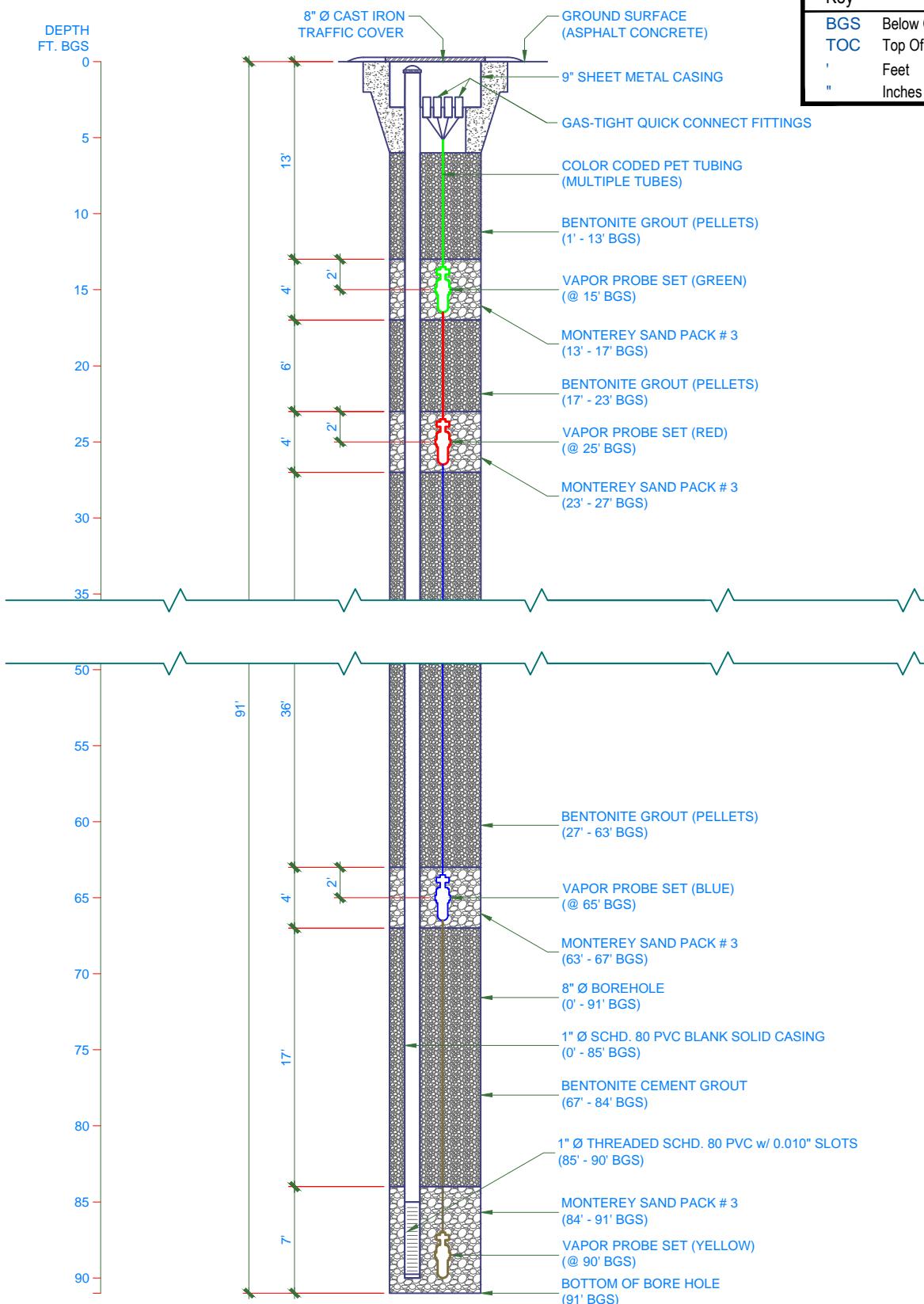
4953-11-1421

BORING M-17 MONITORING WELL DETAIL

METHANE

Vertical Scale: 1" = 10'-0"
Horizontal Scale Exaggerated

Key	
BGS	Below Ground Surface
TOC	Top Of Casing
'	Feet
"	Inches



AMEC
Environment & Infrastructure, Inc.
5628 E. Slauson Avenue, Los Angeles, California 90040
Phone (323) 889-5300 Fax (323) 889-5398

WELL NO.:	M-17	DRAWN:	L. Morley
INSTALLED:	06/28/2009	CHKD:	Jag
SCALE:	1" = 10' Vertical	DATE:	March 20, 2012
DRILL CO.:	Cascade Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:			Paul Kane
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Wilshire & South Stanley, Los Angeles, CA		

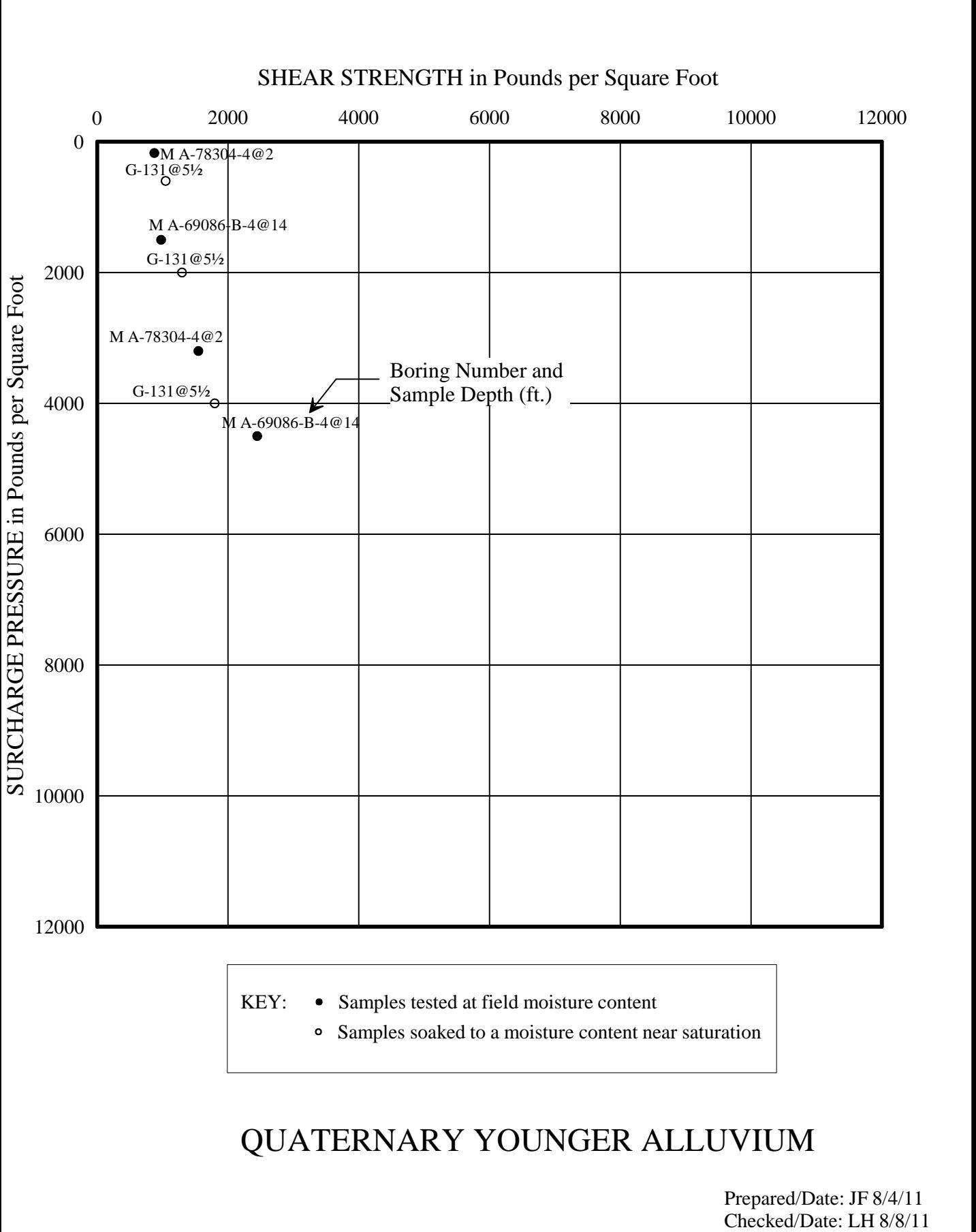
MTA WESTSIDE SUBWAY EXTENSION
Parsons Brinckerhoff

WELL CONSTRUCTION DETAIL
Methane Gas Monitoring Well

FIGURE NO.
C-2

PROJECT NO.
4953-11-1421

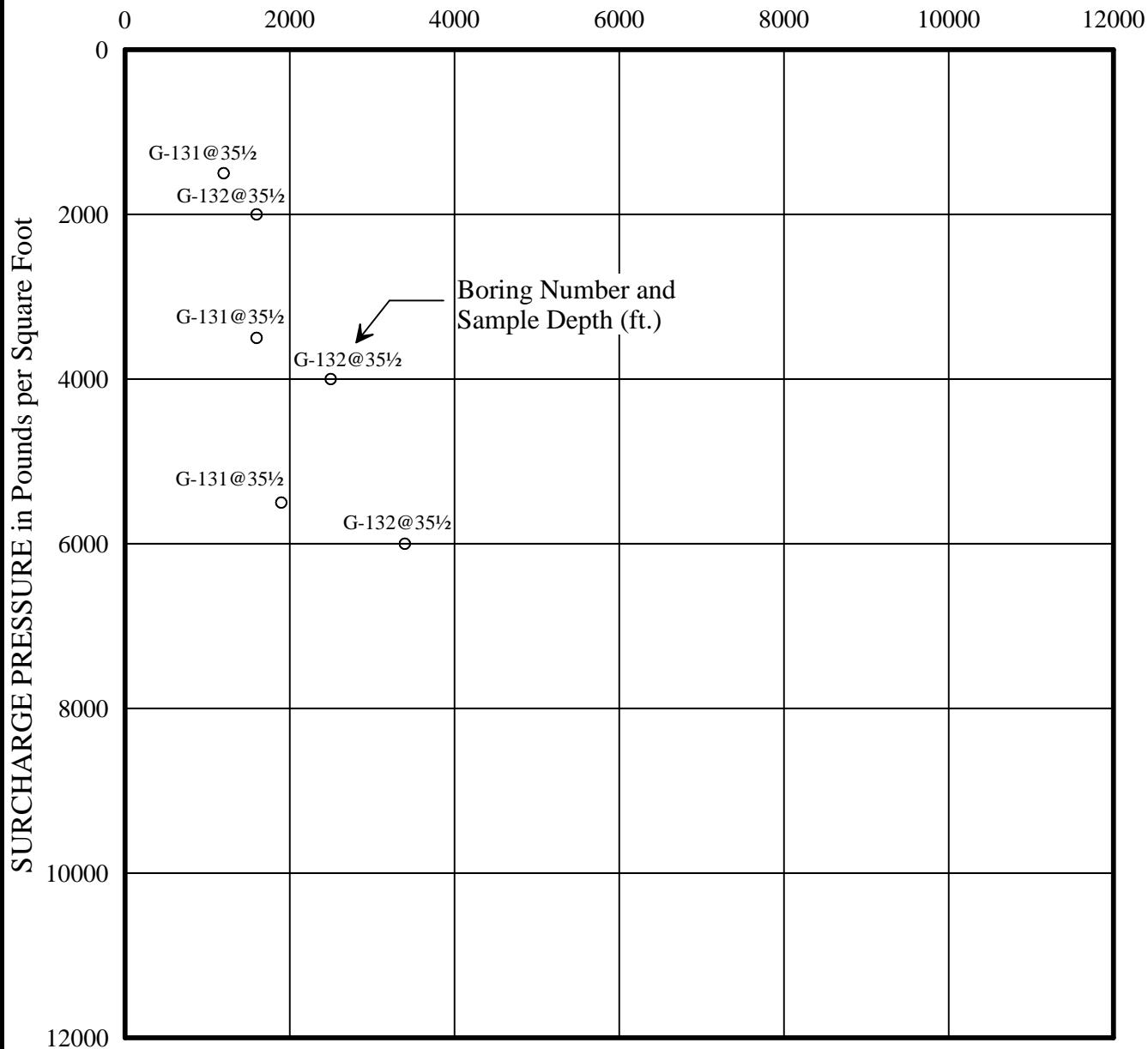
APPENDIX D



QUATERNARY YOUNGER ALLUVIUM

Prepared/Date: JF 8/4/11
Checked/Date: LH 8/8/11

SHEAR STRENGTH in Pounds per Square Foot



KEY:

- Samples tested at field moisture content
- Samples soaked to a moisture content near saturation

SAN PEDRO FORMATION

Prepared/Date: JF 8/4/11
Checked/Date: LH 8/8/11

MTA Westside Subway Extension
Los Angeles, California



DIRECT SHEAR TEST DATA
Project No.: 4953-10-1561
Figure D-1.2



AP Engineering & Testing, Inc.

CONSOLIDATED UNDRAINED TRIAXIAL TEST WITH PORE PRESSURE MEASUREMENT

Test Procedure: ASTM D 4767

Project Name:	West Subway Extension	Tested by: AP	Date: 06-01-11
Project No.:	4953-10-1561	Input Data by: KM	Date: 06-15-11
Test Pit:	G-131	Reviewed by: AP	Date: 06-15-11
Sample No.:	-	Sample Description: Olive Brown Clay	
Depth(ft):	25		
Sample Type:	Mod. Cal.	Confining Pressure = 15.0 psi	

Diameter (in)	<u>2.614</u>	<u>2.614</u>	<u>2.614</u>	Avg. =	2.614
Height (in)	<u>5.725</u>	<u>5.725</u>	<u>5.725</u>	Avg. =	5.725

BEFORE CONSOLIDATION		AFTER CONSOLIDATION
Area (in²)	5.367	5.369
Moisture Content (%)	25.15	24.26
Wet Weight (gms)	89.04	1134.07
Dry Weight (gms)	81.37	941.86
Container Weight (gms)	50.87	149.52
Density and Saturation		
Wet Weight (gms)	999.09	
Container Weight (gms)	0.00	
Wet Density (pcf)	123.9	
Dry Density (pcf)	99.0	
Initial Void Ratio	0.702	
% Saturation	96.7	
		Assumed Specific Gravity = 2.70

Back Pressure Saturation		
B Value (%) =	<u>96</u>	Change in Ht. of the Specimen (in)= 0

Consolidation		
Cell Pressure (psi) =	45.0	Initial Burette Ht.(cm)= 64.8
Back Pressure(psi) =	30.0	Final Burette Ht.(cm)= 57.4
Eff. Consol. Stress (psi) =	15.0	Final Height (in)= 5.638
Induced OCR =	1.0	Initial Volume (cu.in)= 30.724
Change in Ht. of Specimen (in) =	0.0867	Final Volume (cu.in) = 30.272

Shear		At Failure	
Rate of Deformation (in/min)=	0.008	Deviator Stress (ksf) =	4.22
Time to 50% primary Consolidation (min) =	3	Eff. Minor Principal stress (ksf) =	0.94
Failure Mode: Bulging Failure		Eff. Major Principal stress (ksf) =	5.15
		Axial Strain (%) =	5.32



AP Engineering & Testing, Inc.

CONSOLIDATED UNDRAINED TRIAXIAL TEST WITH PORE PRESSURE MEASUREMENT

Test Procedure: ASTM D 4767

Project Name:	West Subway Extension	Tested by: AP	Date: 06-01-11
Project No.:	4953-10-1561	Input Data by: KM	Date: 06-15-11
Test Pit:	G-131	Reviewed by: AP	Date: 06-15-11
Sample No.:	-	Sample Description: Olive Brown Clay	
Depth(ft):	25		
Sample Type:	Mod. Cal.	Confining Pressure = 25.0 psi	

Diameter (in)	<u>2.614</u>	<u>2.614</u>	<u>2.614</u>	Avg. =	2.614
Height (in)	<u>5.725</u>	<u>5.725</u>	<u>5.725</u>	Avg. =	5.725

	BEFORE CONSOLIDATION	AFTER CONSOLIDATION
Area (in²)	5.367	5.352
Moisture Content (%)	25.15	24.26
Wet Weight (gms)	89.04	1134.07
Dry Weight (gms)	81.37	941.86
Container Weight (gms)	50.87	149.52
Density and Saturation		
Wet Weight (gms)	999.09	
Container Weight (gms)	0.00	
Wet Density (pcf)	123.9	
Dry Density (pcf)	99.0	
Initial Void Ratio	0.702	
% Saturation	96.7	

Assumed Specific Gravity = 2.70

Back Pressure Saturation		
B Value (%) =	96	Change in Ht. of the Specimen (in)= 0

Consolidation		
Cell Pressure (psi) =	55.0	Initial Burette Ht.(cm)= 61.0
Back Pressure(psi) =	30.0	Final Burette Ht.(cm)= 51.5
Eff. Consol. Stress (psi) =	25.0	Final Height (in)= 5.631
Induced OCR=	1.0	Initial Volume (cu.in)= 30.724
Change in Ht. of Specimen (in) =	0.0937	Final Volume (cu.in) = 30.141

Shear		At Failure	
Rate of Deformation (in/min)=	0.008	Deviator Stress (ksf) =	6.78
Time to 50% primary Consolidation =	3	Eff. Minor Principal stress (ksf) =	1.96
Failure Mode: Bulging Failure		Eff. Major Principal stress (ksf) =	8.74
		Axial Strain (%) =	5.21



AP Engineering & Testing, Inc.

CONSOLIDATED UNDRAINED TRIAXIAL TEST WITH PORE PRESSURE MEASUREMENT

Test Procedure: ASTM D 4767

Project Name:	West Subway Extension	Tested by: AP	Date: 06-01-11
Project No.:	4953-10-1561	Input Data by: KM	Date: 06-15-11
Test Pit:	G-131	Reviewed by: AP	Date: 06-15-11
Sample No.:	-	Sample Description: Olive Brown Clay	
Depth(ft):	25		
Sample Type:	Mod. Cal.	Confining Pressure = 35.0 psi	

Diameter (in)	<u>2.614</u>	<u>2.614</u>	<u>2.614</u>	Avg. =	2.614
Height (in)	<u>5.725</u>	<u>5.725</u>	<u>5.725</u>	Avg. =	5.725

BEFORE CONSOLIDATION		AFTER CONSOLIDATION
Area (in²)	5.367	5.392
Moisture Content (%)	25.15	24.26
Wet Weight (gms)	89.04	1134.07
Dry Weight (gms)	81.37	941.86
Container Weight (gms)	50.87	149.52
Density and Saturation		
Wet Weight (gms)	999.09	
Container Weight (gms)	0.00	
Wet Density (pcf)	123.9	
Dry Density (pcf)	99.0	
Initial Void Ratio	0.702	
% Saturation	96.7	

Assumed Specific Gravity = 2.70

Back Pressure Saturation		
B Value (%) =	<u>96</u>	Change in Ht. of the Specimen (in)= 0

Consolidation		
Cell Pressure (psi) =	65.0	Initial Burette Ht.(cm)= 51.4
Back Pressure(psi) =	30.0	Final Burette Ht.(cm)= 43.6
Eff. Consol. Stress (psi) =	35.0	Final Height (in)= 5.610
Induced OCR =	1.0	Initial Volume (cu.in)= 30.724
Change in Ht. of Specimen (in) =	0.1147	Final Volume (cu.in) = 30.248

Shear		At Failure	
Rate of Deformation (in/min)=	0.008	Deviator Stress (ksf) =	9.56
Time to 50% primary Consolidation =	3	Eff. Minor Principal stress (ksf) =	2.91
Failure Mode: Bulging Failure		Eff. Major Principal stress (ksf) =	12.46
		Axial Strain (%) =	8.23



AP Engineering & Testing, Inc.

CONSOLIDATED UNDRAINED TRIAXIAL TEST WITH PORE PRESSURE MEASUREMENT

Project Name:	West Subway Extension	Cell Pressure:	45.0 psi
Project No:	4953-10-1561	Back Pressure :	30.0 psi
Test Pit:	G-131	Consolidation Pressure :	15.0 psi
Depth(ft):	25	Initial Sample Height:	5.725 in
Sample No.:	-	Initial Area of Sample:	5.367 sq. in.
Sample Type:	Mod. Cal.	Final Sample Ht.* (L):	5.638 in
Sample Description:	Olive Brown Clay	Final Sample Area (A)*:	5.369 sq. in.
		Induced OCR=	1.0

Cell Pressure (psi)	Load (lbs)	Axial Deformation (in)	Back Pressure (psi)	Deviator Stress (S1-S3) (ksf)	Axial Strain (%)	Pore Pressure Change (ksf)	Shear Stress q' (S1-S3)/2 (ksf)	Normal Stress p' (S1'+S3')/2 (ksf)
45.0	0	0.000	30.0	0.00	0.00	0.00	0.00	2.16
45.0	44	0.006	32.5	1.18	0.11	0.36	0.59	2.39
45.0	50	0.012	33.3	1.32	0.21	0.48	0.66	2.35
45.0	56	0.018	33.9	1.50	0.32	0.56	0.75	2.35
45.0	62	0.024	34.4	1.65	0.43	0.63	0.82	2.35
45.0	66	0.030	34.9	1.76	0.53	0.70	0.88	2.34
45.0	77	0.042	36.0	2.05	0.74	0.86	1.02	2.32
45.0	81	0.054	36.4	2.16	0.96	0.92	1.08	2.32
45.0	85	0.060	36.7	2.25	1.06	0.96	1.12	2.32
45.0	94	0.080	37.4	2.47	1.42	1.07	1.24	2.33
45.0	101	0.100	37.9	2.67	1.77	1.14	1.33	2.36
45.0	120	0.150	38.6	3.13	2.66	1.24	1.57	2.49
45.0	136	0.200	38.8	3.53	3.55	1.27	1.76	2.66
45.0	152	0.250	38.7	3.89	4.43	1.25	1.95	2.85
45.0	166	0.300	38.5	4.22	5.32	1.22	2.11	3.04

Figure D-2.4



CONSOLIDATED UNDRAINED TRIAXIAL TEST WITH PORE PRESSURE MEASUREMENT

Project Name:	West Subway Extension	Cell Pressure:	55.0 psi
Project No:	4953-10-1561	Back Pressure :	30.0 psi
Test Pit:	G-131	Consolidation Pressure :	25.0 psi
Depth(ft):	25	Initial Sample Height:	5.725 in
Sample No.:	-	Initial Area of Sample:	5.367 sq. in.
Sample Type:	Mod. Cal.	Final Sample Ht.* (L):	5.631 in
Sample Description:	Olive Brown Clay	Final Sample Area (A)*:	5.352 sq. in.
		Induced OCR=	1.0

Cell Pressure (psi)	Load (lbs)	Axial Deformation (in)	Back Pressure (psi)	Deviator Stress (S1-S3) (ksf)	Axial Strain (%)	Pore Pressure Change (ksf)	Shear Stress q' (S1-S3)/2 (ksf)	Normal Stress p' (S1'+S3')/2 (ksf)
55.0	0	0.000	30.0	0.00	0.00	0.00	0.00	3.60
55.0	34	0.002	31.8	0.91	0.03	0.26	0.46	3.80
55.0	59	0.005	33.5	1.59	0.09	0.50	0.79	3.89
55.0	74	0.009	34.7	1.99	0.16	0.68	0.99	3.91
55.0	87	0.013	35.8	2.34	0.22	0.83	1.17	3.93
55.0	97	0.017	36.7	2.60	0.29	0.96	1.30	3.94
55.0	107	0.021	37.4	2.87	0.37	1.07	1.43	3.97
55.0	115	0.024	38.1	3.08	0.43	1.16	1.54	3.98
55.0	123	0.028	38.7	3.29	0.50	1.25	1.65	4.00
55.0	131	0.031	39.2	3.50	0.55	1.32	1.75	4.03
55.0	138	0.035	39.7	3.69	0.62	1.39	1.84	4.06
55.0	144	0.039	40.1	3.85	0.69	1.45	1.92	4.07
55.0	178	0.062	42.0	4.74	1.10	1.72	2.37	4.25
55.0	206	0.092	43.1	5.45	1.64	1.89	2.73	4.44
55.0	219	0.115	43.3	5.77	2.05	1.92	2.89	4.57
55.0	224	0.128	43.3	5.89	2.27	1.92	2.94	4.62
55.0	229	0.140	43.3	6.01	2.48	1.92	3.00	4.69
55.0	233	0.152	43.2	6.10	2.69	1.90	3.05	4.75
55.0	237	0.163	43.1	6.19	2.90	1.89	3.10	4.81
55.0	241	0.175	43.0	6.28	3.11	1.87	3.14	4.87
55.0	244	0.187	42.8	6.35	3.32	1.85	3.17	4.92
55.0	247	0.199	42.7	6.41	3.52	1.83	3.21	4.98
55.0	250	0.210	42.5	6.47	3.73	1.81	3.24	5.03
55.0	252	0.222	42.4	6.51	3.94	1.78	3.26	5.07
55.0	255	0.234	42.2	6.58	4.15	1.76	3.29	5.13
55.0	257	0.246	42.1	6.61	4.37	1.74	3.31	5.17
55.0	259	0.258	41.9	6.65	4.58	1.71	3.32	5.21
55.0	261	0.270	41.7	6.69	4.79	1.69	3.34	5.25
55.0	264	0.282	41.6	6.75	5.00	1.66	3.37	5.31
55.0	266	0.293	41.4	6.78	5.21	1.64	3.39	5.35

Figure D-2.5



CONSOLIDATED UNDRAINED TRIAXIAL TEST WITH PORE PRESSURE MEASUREMENT

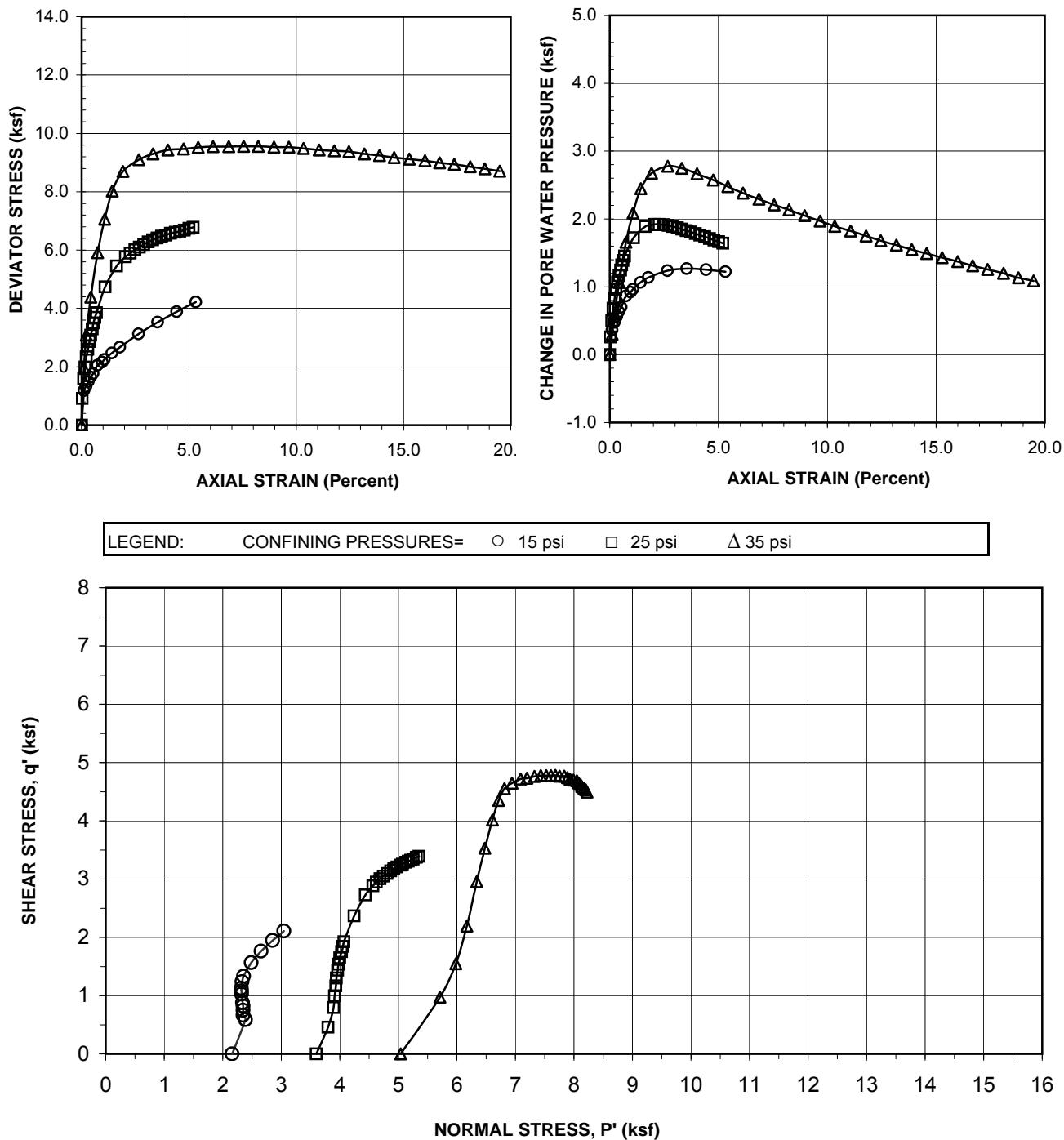
Project Name:	West Subway Extension	Cell Pressure:	65.0 psi
Project No:	4953-10-1561	Back Pressure :	30.0 psi
Test Pit:	G-131	Consolidation Pressure :	35.0 psi
Depth(ft):	25	Initial Sample Height:	5.725 in
Sample No.:	-	Initial Area of Sample:	5.367 sq. in.
Sample Type:	Mod. Cal.	Final Sample Ht.* (L):	5.610 in
Sample Description:	Olive Brown Clay	Final Sample Area (A)*:	5.392 sq. in.
		Induced OCR=	1.0

Cell Pressure (psi)	Load (lbs)	Axial Deformation (in)	Back Pressure (psi)	Deviator Stress (S1-S3) (ksf)	Axial Strain (%)	Pore Pressure Change (ksf)	Shear Stress q' (S1-S3)/2 (ksf)	Normal Stress p' (S1'+S3')/2 (ksf)
65.0	0	0.000	30.0	0.00	0.00	0.00	0.00	5.04
65.0	73	0.006	32.1	1.95	0.11	0.30	0.97	5.71
65.0	116	0.012	34.2	3.09	0.21	0.60	1.55	5.98
65.0	165	0.024	37.4	4.39	0.43	1.07	2.19	6.17
65.0	223	0.042	41.5	5.91	0.75	1.66	2.96	6.34
65.0	267	0.060	44.5	7.05	1.07	2.09	3.53	6.48
65.0	305	0.080	47.0	8.03	1.43	2.45	4.01	6.61
65.0	332	0.108	48.6	8.70	1.92	2.67	4.35	6.72
65.0	350	0.150	49.3	9.10	2.66	2.78	4.55	6.81
65.0	360	0.186	49.1	9.30	3.32	2.75	4.65	6.94
65.0	368	0.225	48.5	9.43	4.02	2.67	4.72	7.09
65.0	372	0.267	47.9	9.46	4.75	2.57	4.73	7.20
65.0	377	0.305	47.2	9.52	5.43	2.48	4.76	7.32
65.0	381	0.344	46.5	9.55	6.13	2.38	4.78	7.43
65.0	384	0.385	45.9	9.55	6.86	2.29	4.78	7.53
65.0	387	0.424	45.3	9.56	7.56	2.21	4.78	7.61
65.0	390	0.462	44.8	9.56	8.23	2.13	4.78	7.69
65.0	392	0.503	44.2	9.53	8.97	2.05	4.77	7.75
65.0	395	0.542	43.7	9.53	9.66	1.97	4.77	7.84
65.0	396	0.580	43.1	9.48	10.35	1.89	4.74	7.89
65.0	397	0.621	42.7	9.43	11.07	1.82	4.71	7.93
65.0	399	0.661	42.2	9.40	11.78	1.75	4.70	7.99
65.0	401	0.699	41.7	9.38	12.46	1.68	4.69	8.05
65.0	401	0.739	41.2	9.30	13.17	1.62	4.65	8.07
65.0	402	0.779	40.8	9.25	13.89	1.55	4.62	8.11
65.0	402	0.818	40.4	9.17	14.57	1.49	4.59	8.14
65.0	403	0.857	39.9	9.12	15.27	1.43	4.56	8.17
65.0	404	0.898	39.5	9.06	16.00	1.37	4.53	8.20
65.0	404	0.936	39.1	8.99	16.68	1.31	4.50	8.22
65.0	405	0.974	38.7	8.94	17.37	1.26	4.47	8.25
65.0	405	1.016	38.3	8.86	18.11	1.20	4.43	8.27
65.0	405	1.054	37.9	8.78	18.79	1.13	4.39	8.30
65.0	405	1.093	37.6	8.71	19.49	1.09	4.35	8.31

Figure D-2.6



AP Engineering & Testing, Inc.



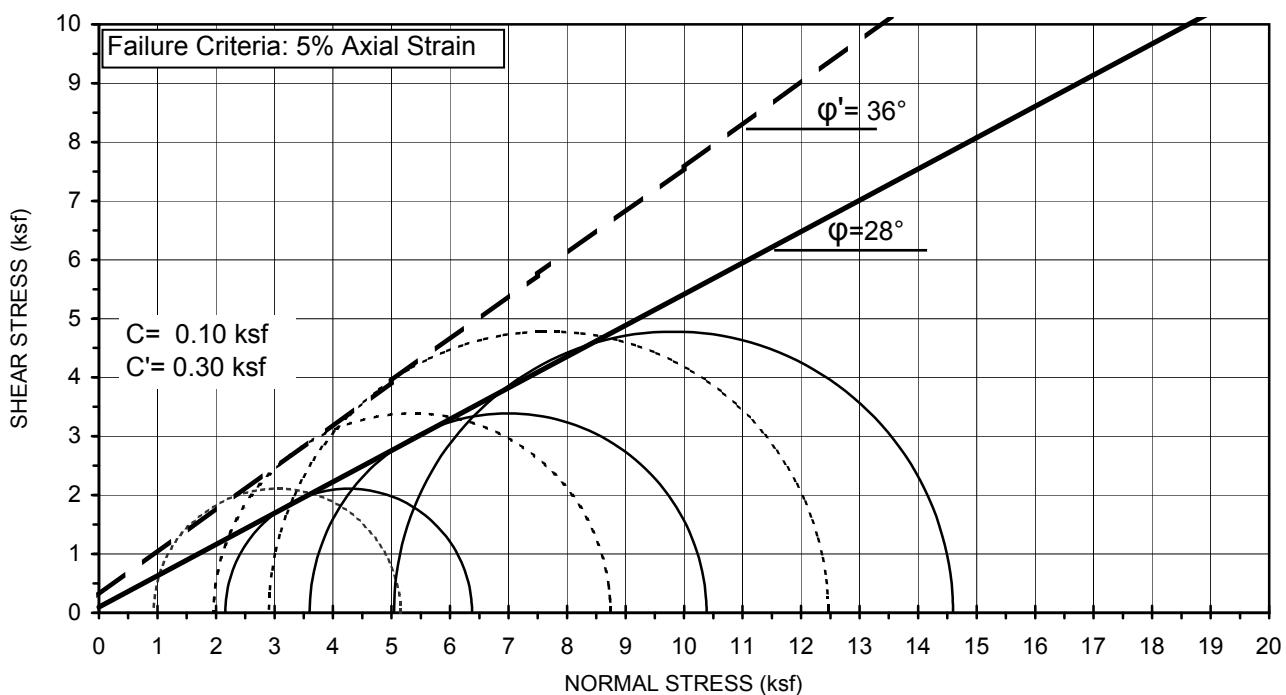
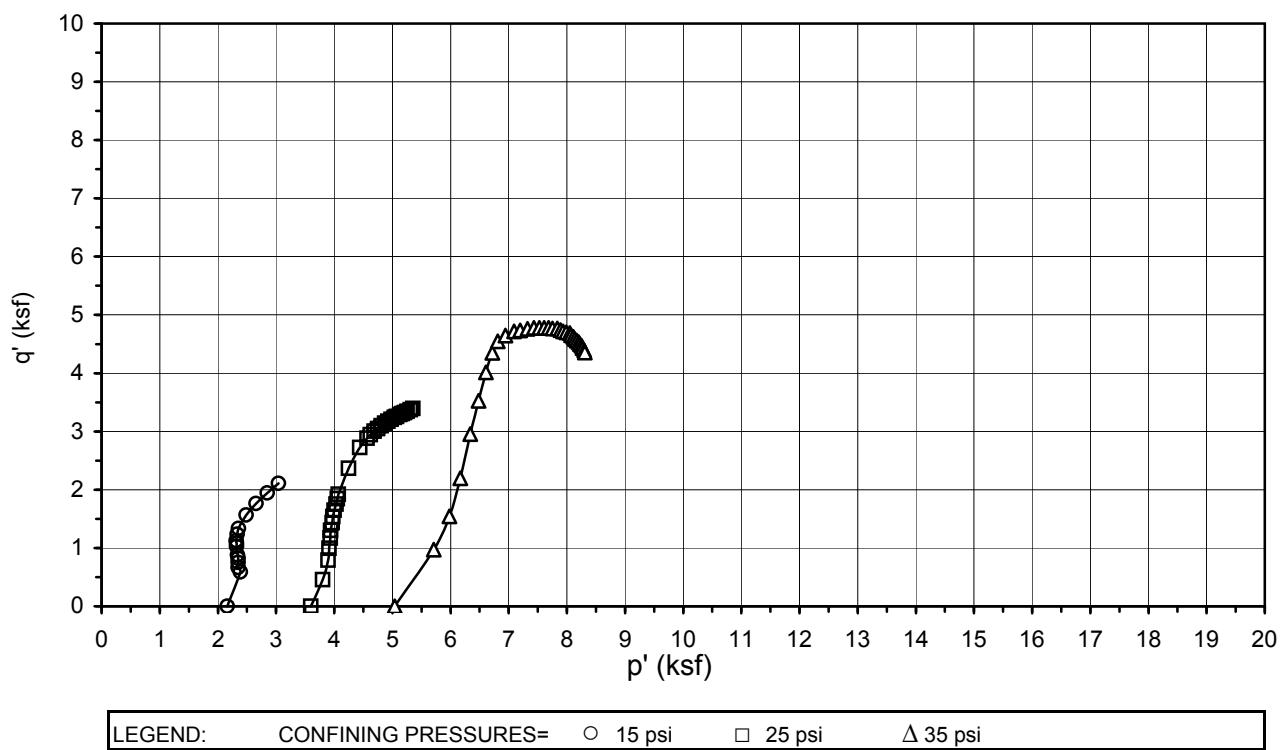
Project Name:	West Subway Extension	Sample Type:	Mod. Cal.
Project No.:	4953-10-1561	Sample Description:	Olive Brown Clay
Test Pit:	G-131	Avg. Dry Unit Weight (pcf):	99.0
Sample No.:	-	Avg. Initial Moisture Content (%):	25.1
Depth (ft):	25	Confining Pressure:	15.0, 25.0, 35.0 psi

CU TRIAXIAL MULTI-STAGE TEST WITH PORE PRESSURE MEASUREMENT
ASTM D 4767

Figure D-2.7



AP Engineering & Testing, Inc.



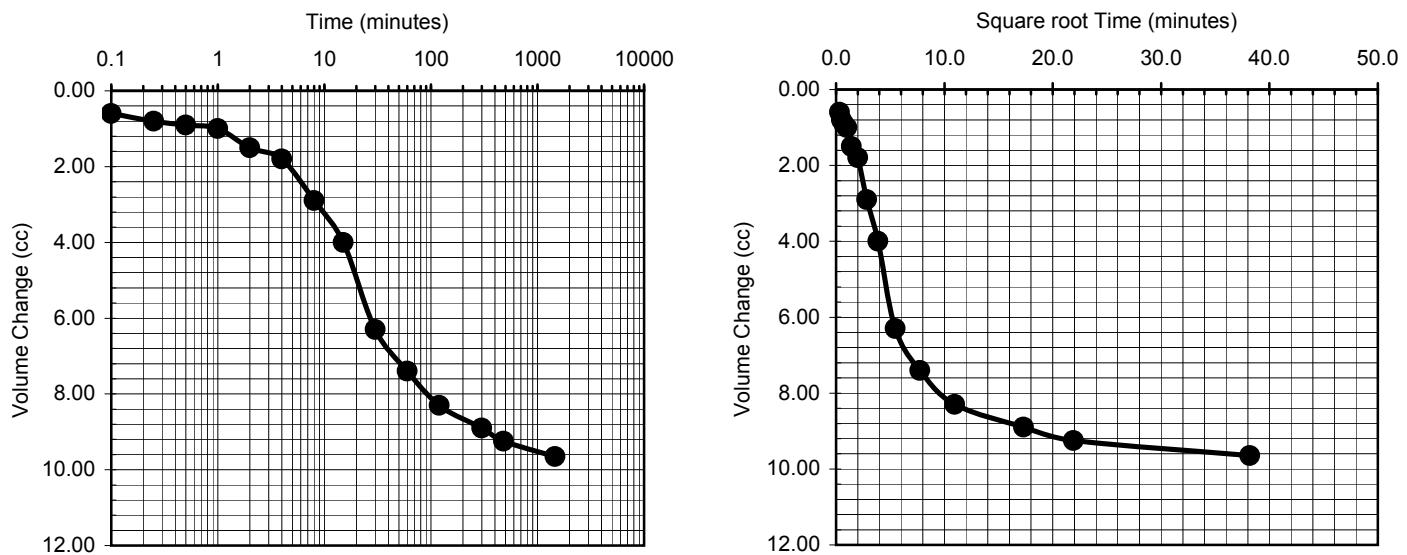
Project Name:	West Subway Extension	Sample Type:	Mod. Cal.
Project No.:	4953-10-1561	Sample Description:	Olive Brown Clay
Test Pit:	G-131	Avg. Dry Unit Weight (pcf):	99.0
Sample No.:	-	Avg. Initial Moisture Content (%):	25.1
Depth (ft):	25	Confining Pressure:	15.0, 25.0, 35.0 psi

CU TRIAXIAL MULTI-STAGE TEST WITH PORE PRESSURE MEASUREMENT
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Figure D-2.8



AP Engineering & Testing, Inc.



Test Pit: G-131
Sample No.: -
Depth (feet): 25

Sample Type: Mod. Cal.
Soil Description: Olive Brown Clay
Eff. Confining Pressure (psi): 25.0

Time (minutes)	Volume Change (cc)
0	0.0000
0.1	0.6000
0.25	0.8000
0.5	0.9000
1	1.0000
2	1.5000
4	1.8000
8	2.9000
15	4.0000
30	6.3000
60	7.4000
120	8.3000
300	8.9000
480	9.2500
1459	9.6500

SQRT Time (minutes)	Volume Change (cc)
0.0000	0.0000
0.3162	0.6000
0.5000	0.8000
0.7071	0.9000
1.0000	1.0000
1.4142	1.5000
2.0000	1.8000
2.8284	2.9000
3.8730	4.0000
5.4772	6.3000
7.7460	7.4000
10.9545	8.3000
17.3205	8.9000
21.9089	9.2500
38.1969	9.6500

TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name: West Subway Extension
Project No.: 4953-10-1561
Date: 06/01/11

Figure D-2.9



CONSOLIDATED UNDRAINED TRIAXIAL TEST WITH PORE PRESSURE MEASUREMENT

Test Procedure: ASTM D 4767

Project Name: West Subway Extension Tested by: AP Date: 06-01-11
 Project No.: 4953-10-1561 Input Data by: KM Date: 06-15-11
 Test Pit: G-132 Reviewed by: AP Date: 06-15-11
 Sample No.: - Sample Description: Olive Brown Clayey Sand
 Depth(ft): 15.5
 Sample Type: Mod. Cal. Confining Pressure = 1.4 ksf

Diameter (in)	<u>2.610</u>	<u>2.610</u>	<u>2.610</u>	Avg. =	2.610
Height (in)	<u>5.458</u>	<u>5.458</u>	<u>5.458</u>	Avg. =	5.458

BEFORE CONSOLIDATION		AFTER CONSOLIDATION
Area (in²)	5.350	5.364
Moisture Content (%)	20.88	22.79
Wet Weight (gms)	126.95	1080.45
Dry Weight (gms)	116.96	907.49
Container Weight (gms)	69.11	148.59
Density and Saturation		
Wet Weight (gms)	945.50	
Container Weight (gms)	0.00	
Wet Density (pcf)	123.3	
Dry Density (pcf)	102.0	
Initial Void Ratio	0.651	
% Saturation	86.6	
		Assumed Specific Gravity = 2.70

Back Pressure Saturation		
B Value (%) =	<u>94</u>	Change in Ht. of the Specimen (in)= 0

Consolidation		
Cell Pressure (psi) =	50.0	Initial Burette Ht.(cm)= 53.1
Back Pressure(psi) =	40.0	Final Burette Ht.(cm)= 49.8
Eff. Consol. Stress (psi) =	10.0	Final Height (in)= 5.407
Induced OCR =	1.0	Initial Volume (cu.in)= 29.201
Change in Ht. of Specimen (in) =	0.0515	Final Volume (cu.in) = 29.000

Shear		At Failure	
Rate of Deformation (in/min)=	0.008	Deviator Stress (ksf) =	3.06
Time to 50% primary Consolidation (min) =	3	Eff. Minor Principal stress (ksf) =	0.86
Failure Mode: Bulging Failure		Eff. Major Principal stress (ksf) =	3.92
		Axial Strain (%) =	5.46



AP Engineering & Testing, Inc.

CONSOLIDATED UNDRAINED TRIAXIAL TEST WITH PORE PRESSURE MEASUREMENT

Test Procedure: ASTM D 4767

Project Name:	West Subway Extension	Tested by: AP	Date: 06-01-11
Project No.:	4953-10-1561	Input Data by: KM	Date: 06-15-11
Test Pit:	G-132	Reviewed by: AP	Date: 06-15-11
Sample No.:	-	Sample Description: Olive Brown Clayey Sand	
Depth(ft):	15.5		
Sample Type:	Mod. Cal.	Confining Pressure = 2.9 ksf	

Diameter (in)	<u>2.610</u>	<u>2.610</u>	<u>2.610</u>	Avg. =	2.610
Height (in)	<u>5.458</u>	<u>5.458</u>	<u>5.458</u>	Avg. =	5.458

BEFORE CONSOLIDATION		AFTER CONSOLIDATION
Area (in²)	5.350	5.268
Moisture Content (%)	20.88	22.79
Wet Weight (gms)	126.95	1080.45
Dry Weight (gms)	116.96	907.49
Container Weight (gms)	69.11	148.59
Density and Saturation		
Wet Weight (gms)	945.50	
Container Weight (gms)	0.00	
Wet Density (pcf)	123.3	
Dry Density (pcf)	102.0	
Initial Void Ratio	0.651	
% Saturation	86.6	

Assumed Specific Gravity = 2.70

Back Pressure Saturation		
B Value (%) =	92	Change in Ht. of the Specimen (in)= 0

Consolidation		
Cell Pressure (psi) =	60.0	Initial Burette Ht.(cm)= 49.7
Back Pressure(psi) =	40.0	Final Burette Ht.(cm)= 37.8
Eff. Consol. Stress (psi) =	20.0	Final Height (in)= 5.406
Induced OCR=	1.0	Initial Volume (cu.in)= 29.201
Change in Ht. of Specimen (in) =	0.0525	Final Volume (cu.in) = 28.475

Shear		At Failure	
Rate of Deformation (in/min)=	0.008	Deviator Stress (ksf) =	5.50
Time to 50% primary Consolidation =	3	Eff. Minor Principal stress (ksf) =	1.89
Failure Mode: Bulging Failure		Eff. Major Principal stress (ksf) =	7.40
		Axial Strain (%) =	5.46



AP Engineering & Testing, Inc.

CONSOLIDATED UNDRAINED TRIAXIAL TEST WITH PORE PRESSURE MEASUREMENT

Test Procedure: ASTM D 4767

Project Name:	West Subway Extension	Tested by: AP	Date: 06-01-11
Project No.:	4953-10-1561	Input Data by: KM	Date: 06-15-11
Test Pit:	G-132	Reviewed by: AP	Date: 06-15-11
Sample No.:	-	Sample Description: Olive Brown Clayey Sand	
Depth(ft):	15.5		
Sample Type:	Mod. Cal.	Confining Pressure = 4.3 ksf	

Diameter (in)	<u>2.610</u>	<u>2.610</u>	<u>2.610</u>	Avg. =	2.610
Height (in)	<u>5.458</u>	<u>5.458</u>	<u>5.458</u>	Avg. =	5.458

BEFORE CONSOLIDATION		AFTER CONSOLIDATION
Area (in²)	5.350	5.305
Moisture Content (%)	20.88	22.79
Wet Weight (gms)	126.95	1080.45
Dry Weight (gms)	116.96	907.49
Container Weight (gms)	69.11	148.59
Density and Saturation		
Wet Weight (gms)	945.50	
Container Weight (gms)	0.00	
Wet Density (pcf)	123.3	
Dry Density (pcf)	102.0	
Initial Void Ratio	0.651	
% Saturation	86.6	

Assumed Specific Gravity = 2.70

Back Pressure Saturation		
B Value (%) =	92	Change in Ht. of the Specimen (in)= 0

Consolidation		
Cell Pressure (psi) =	70.0	Initial Burette Ht.(cm)= 38.6
Back Pressure(psi) =	40.0	Final Burette Ht.(cm)= 29.9
Eff. Consol. Stress (psi) =	30.0	Final Height (in)= 5.404
Induced OCR =	1.0	Initial Volume (cu.in)= 29.201
Change in Ht. of Specimen (in) =	0.0539	Final Volume (cu.in) = 28.671

Shear		At Failure	
Rate of Deformation (in/min)=	0.008	Deviator Stress (ksf) =	8.68
Time to 50% primary Consolidation =	3	Eff. Minor Principal stress (ksf) =	3.39
Failure Mode: Bulging Failure		Eff. Major Principal stress (ksf) =	12.07
		Axial Strain (%) =	10.65



CONSOLIDATED UNDRAINED TRIAXIAL TEST WITH PORE PRESSURE MEASUREMENT

Project Name:	West Subway Extension	Cell Pressure:	50.0 psi
Project No:	4953-10-1561	Back Pressure :	40.0 psi
Test Pit:	G-132	Consolidation Pressure :	10.0 psi
Depth(ft):	15.5	Initial Sample Height:	5.458 in
Sample No.:	-	Initial Area of Sample:	5.350 sq. in.
Sample Type:	Mod. Cal.	Final Sample Ht.* (L):	5.407 in
Sample Description:	Olive Brown Clayey Sand	Final Sample Area (A)*:	5.364 sq. in.
		Induced OCR=	1.0

Cell Pressure (psi)	Load (lbs)	Axial Deformation (in)	Back Pressure (psi)	Deviator Stress (S1-S3) (ksf)	Axial Strain (%)	Pore Pressure Change (ksf)	Shear Stress q' (S1-S3)/2 (ksf)	Normal Stress p' (S1+S3')/2 (ksf)
50.0	0	0.000	40.0	0.00	0.00	0.00	0.00	1.44
50.0	16	0.002	40.8	0.43	0.03	0.11	0.22	1.55
50.0	29	0.006	41.5	0.77	0.10	0.21	0.39	1.62
50.0	36	0.010	42.0	0.96	0.18	0.29	0.48	1.63
50.0	39	0.013	42.5	1.05	0.25	0.35	0.52	1.61
50.0	44	0.017	42.9	1.17	0.31	0.41	0.58	1.61
50.0	46	0.021	43.2	1.23	0.38	0.46	0.62	1.60
50.0	49	0.025	43.5	1.32	0.45	0.50	0.66	1.60
50.0	52	0.028	43.7	1.38	0.52	0.53	0.69	1.60
50.0	54	0.032	43.9	1.44	0.60	0.56	0.72	1.60
50.0	55	0.036	44.1	1.47	0.67	0.59	0.74	1.59
50.0	58	0.039	44.2	1.53	0.73	0.61	0.77	1.60
50.0	61	0.047	44.5	1.62	0.87	0.65	0.81	1.61
50.0	66	0.058	44.8	1.74	1.07	0.68	0.87	1.63
50.0	70	0.070	44.9	1.86	1.29	0.71	0.93	1.66
50.0	74	0.082	45.1	1.95	1.52	0.73	0.97	1.69
50.0	77	0.093	45.1	2.03	1.73	0.74	1.02	1.72
50.0	81	0.106	45.2	2.12	1.96	0.74	1.06	1.76
50.0	84	0.118	45.2	2.20	2.18	0.74	1.10	1.80
50.0	86	0.129	45.2	2.26	2.39	0.74	1.13	1.83
50.0	90	0.142	45.1	2.35	2.62	0.74	1.17	1.87
50.0	92	0.153	45.1	2.40	2.82	0.73	1.20	1.91
50.0	95	0.164	45.0	2.48	3.04	0.73	1.24	1.96
50.0	98	0.176	45.0	2.54	3.25	0.72	1.27	1.99
50.0	100	0.188	44.9	2.59	3.47	0.70	1.30	2.03
50.0	104	0.200	44.8	2.68	3.70	0.69	1.34	2.09
50.0	106	0.212	44.7	2.73	3.92	0.68	1.36	2.12
50.0	108	0.224	44.6	2.78	4.14	0.67	1.39	2.16
50.0	110	0.236	44.5	2.83	4.37	0.65	1.42	2.20
50.0	113	0.248	44.4	2.89	4.59	0.64	1.44	2.24
50.0	114	0.260	44.4	2.91	4.81	0.63	1.45	2.27
50.0	116.15	0.272	44.3	2.96	5.02	0.61	1.48	2.31
50.0	118.45	0.283	44.2	3.01	5.24	0.60	1.51	2.35
50.0	120.75	0.295	44.1	3.06	5.46	0.58	1.53	2.39

Figure D-2.13



CONSOLIDATED UNDRAINED TRIAXIAL TEST WITH PORE PRESSURE MEASUREMENT

Project Name:	West Subway Extension	Cell Pressure:	60.0 psi
Project No:	4953-10-1561	Back Pressure :	40.0 psi
Test Pit:	G-132	Consolidation Pressure :	20.0 psi
Depth(ft):	15.5	Initial Sample Height:	5.458 in
Sample No.:	-	Initial Area of Sample:	5.350 sq. in.
Sample Type:	Mod. Cal.	Final Sample Ht.* (L):	5.406 in
Sample Description:	Olive Brown Clayey Sand	Final Sample Area (A)*:	5.268 sq. in.
		Induced OCR=	1.0

Cell Pressure (psi)	Load (lbs)	Axial Deformation (in)	Back Pressure (psi)	Deviator Stress (S1-S3) (ksf)	Axial Strain (%)	Pore Pressure Change (ksf)	Shear Stress q' (S1-S3)/2 (ksf)	Normal Stress p' (S1'+S3')/2 (ksf)
60.0	0	0.000	40.0	0.00	0.00	0.00	0.00	2.88
60.0	5	0.000	40.1	0.14	0.00	0.01	0.07	2.94
60.0	43	0.005	42.1	1.17	0.09	0.31	0.59	3.16
60.0	67	0.010	43.8	1.83	0.19	0.54	0.91	3.25
60.0	83	0.016	44.9	2.26	0.30	0.70	1.13	3.31
60.0	117	0.033	46.8	3.18	0.61	0.97	1.59	3.49
60.0	133	0.045	47.4	3.61	0.83	1.07	1.80	3.61
60.0	145	0.057	47.9	3.92	1.05	1.13	1.96	3.71
60.0	155	0.068	48.2	4.18	1.26	1.17	2.09	3.80
60.0	163	0.080	48.3	4.39	1.48	1.20	2.19	3.88
60.0	169	0.092	48.4	4.54	1.69	1.21	2.27	3.94
60.0	174	0.104	48.4	4.67	1.92	1.21	2.33	4.00
60.0	178	0.115	48.4	4.76	2.13	1.21	2.38	4.05
60.0	182	0.128	48.4	4.86	2.37	1.20	2.43	4.11
60.0	185	0.140	48.3	4.93	2.59	1.19	2.46	4.15
60.0	188	0.152	48.2	4.99	2.80	1.18	2.50	4.20
60.0	191	0.164	48.1	5.06	3.03	1.17	2.53	4.25
60.0	193	0.176	48.0	5.10	3.25	1.15	2.55	4.28
60.0	196	0.187	47.9	5.17	3.46	1.14	2.59	4.33
60.0	198	0.200	47.8	5.21	3.70	1.12	2.61	4.37
60.0	200	0.211	47.7	5.25	3.91	1.10	2.63	4.40
60.0	202	0.223	47.5	5.29	4.12	1.09	2.65	4.44
60.0	204	0.235	47.4	5.33	4.34	1.07	2.67	4.48
60.0	206	0.247	47.3	5.37	4.56	1.05	2.69	4.52
60.0	208	0.259	47.2	5.41	4.79	1.03	2.71	4.55
60.0	209	0.271	47.1	5.43	5.00	1.02	2.71	4.57
60.0	211	0.282	47.0	5.47	5.22	1.01	2.73	4.61
60.0	213	0.295	46.9	5.50	5.46	0.99	2.75	4.64

Figure D-2.14



CONSOLIDATED UNDRAINED TRIAXIAL TEST WITH PORE PRESSURE MEASUREMENT

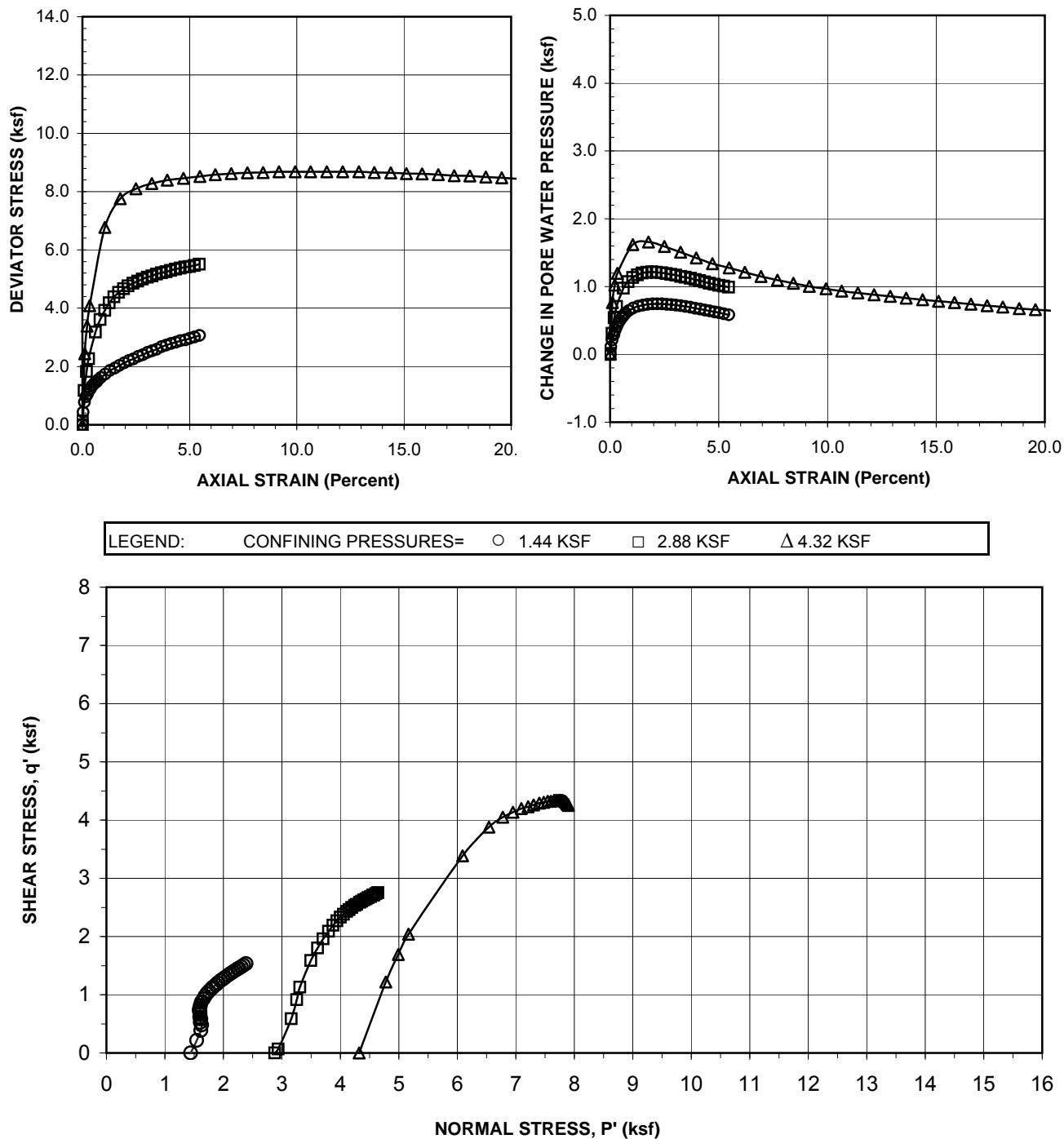
Project Name:	West Subway Extension	Cell Pressure:	70.0 psi
Project No:	4953-10-1561	Back Pressure :	40.0 psi
Test Pit:	G-132	Consolidation Pressure :	30.0 psi
Depth(ft):	15.5	Initial Sample Height:	5.458 in
Sample No.:	-	Initial Area of Sample:	5.350 sq. in.
Sample Type:	Mod. Cal.	Final Sample Ht.* (L):	5.404 in
Sample Description:	Olive Brown Clayey Sand	Final Sample Area (A)*:	5.305 sq. in.
		Induced OCR=	1.0

Cell Pressure (psi)	Load (lbs)	Axial Deformation (in)	Back Pressure (psi)	Deviator Stress (S1-S3) (ksf)	Axial Strain (%)	Pore Pressure Change (ksf)	Shear Stress q' (S1-S3)/2 (ksf)	Normal Stress p' (S1'+S3')/2 (ksf)
70.0	0	0.000	40.0	0.00	0.00	0.00	0.00	4.32
70.0	90	0.006	45.3	2.44	0.11	0.76	1.22	4.78
70.0	125	0.012	47.1	3.39	0.22	1.02	1.69	4.99
70.0	151	0.018	48.3	4.08	0.34	1.20	2.04	5.17
70.0	252	0.057	51.2	6.77	1.05	1.62	3.38	6.09
70.0	291	0.095	51.5	7.76	1.77	1.66	3.88	6.54
70.0	306	0.135	51.1	8.10	2.50	1.59	4.05	6.78
70.0	315	0.175	50.5	8.27	3.25	1.51	4.14	6.95
70.0	322	0.214	49.9	8.39	3.96	1.42	4.20	7.10
70.0	327	0.255	49.3	8.46	4.71	1.34	4.23	7.21
70.0	332	0.296	48.9	8.52	5.48	1.27	4.26	7.30
70.0	337	0.335	48.4	8.58	6.20	1.21	4.29	7.40
70.0	341	0.375	48.0	8.61	6.95	1.15	4.31	7.48
70.0	345	0.416	47.6	8.64	7.70	1.10	4.32	7.55
70.0	348	0.456	47.3	8.65	8.43	1.05	4.32	7.60
70.0	352	0.495	47.0	8.68	9.17	1.00	4.34	7.66
70.0	355	0.537	46.7	8.68	9.93	0.97	4.34	7.69
70.0	358	0.576	46.5	8.68	10.65	0.93	4.34	7.73
70.0	361	0.616	46.3	8.68	11.40	0.91	4.34	7.76
70.0	364	0.657	46.1	8.68	12.15	0.88	4.34	7.78
70.0	367	0.697	45.9	8.68	12.89	0.86	4.34	7.80
70.0	369	0.736	45.8	8.65	13.62	0.83	4.33	7.82
70.0	372	0.777	45.6	8.65	14.38	0.80	4.32	7.84
70.0	374	0.817	45.4	8.62	15.11	0.78	4.31	7.85
70.0	377	0.856	45.3	8.61	15.85	0.76	4.31	7.86
70.0	379	0.897	45.2	8.58	16.61	0.74	4.29	7.87
70.0	381	0.938	45.0	8.55	17.35	0.72	4.27	7.87
70.0	384	0.977	44.8	8.54	18.07	0.70	4.27	7.89
70.0	386	1.017	44.7	8.50	18.82	0.68	4.25	7.90
70.0	388	1.057	44.6	8.47	19.57	0.66	4.24	7.90
70.0	390	1.097	44.5	8.44	20.30	0.64	4.22	7.89

Figure D-2.15



AP Engineering & Testing, Inc.

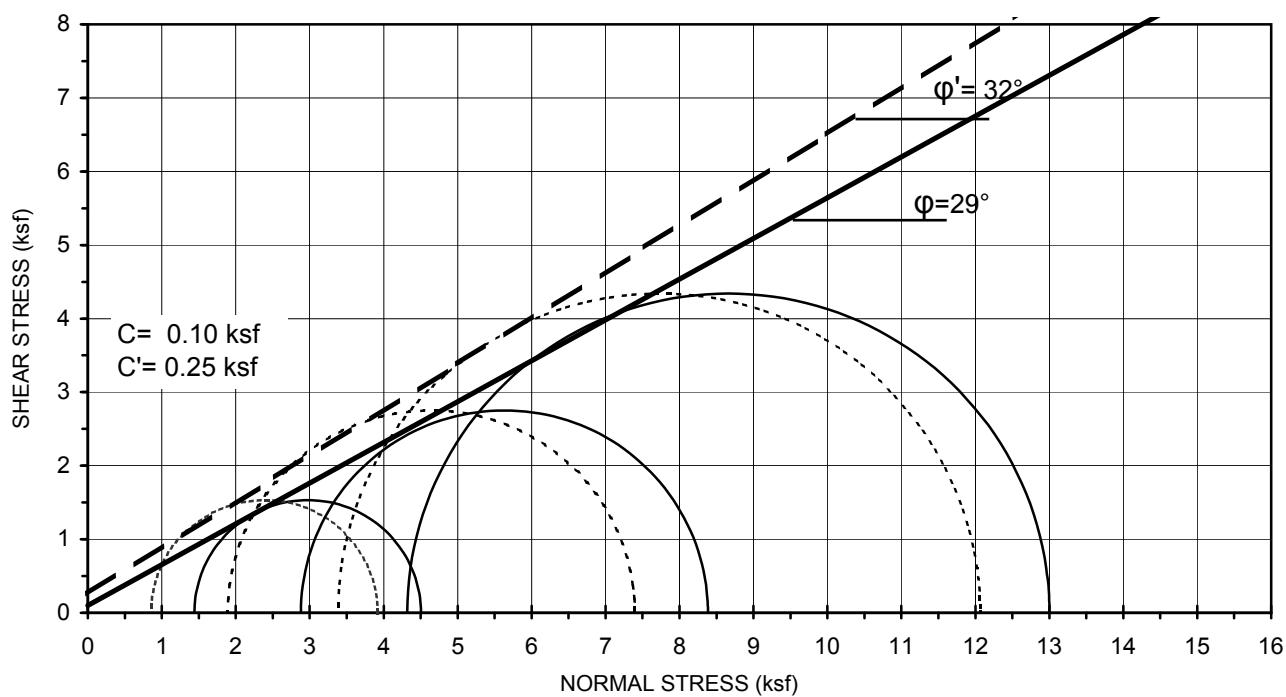
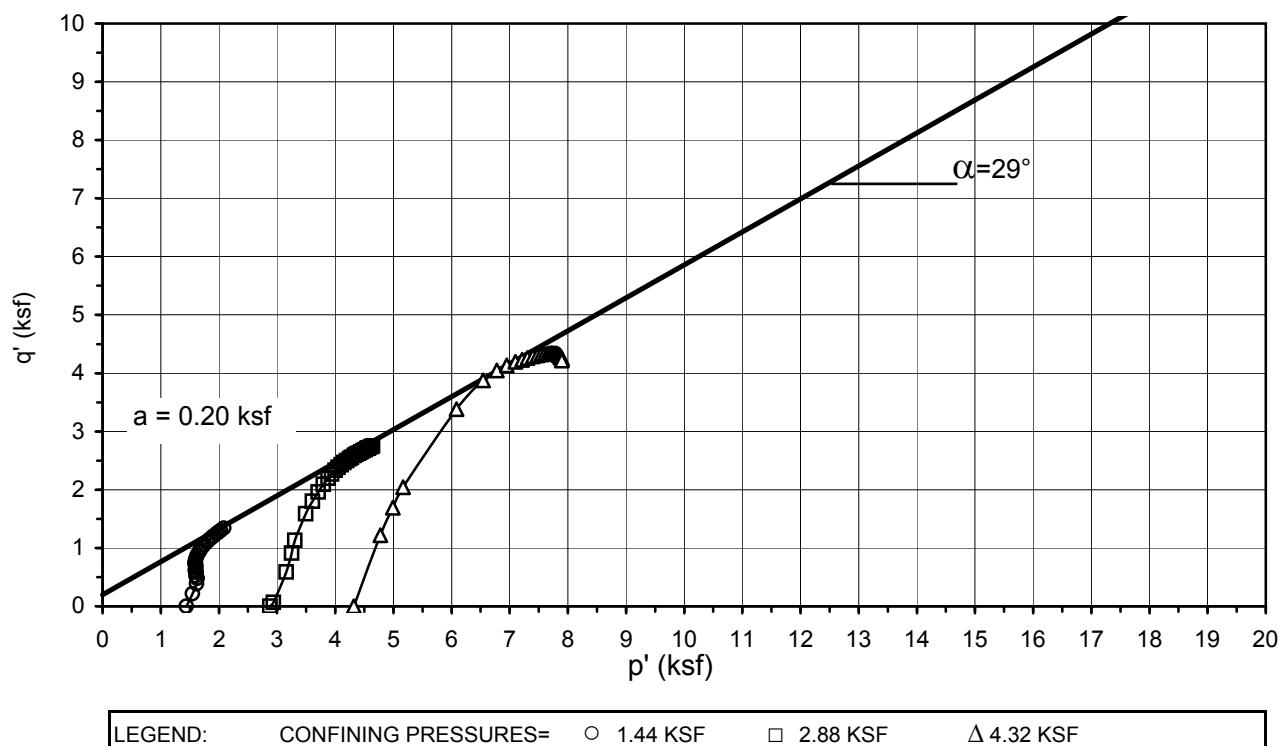


Project Name:	West Subway Extension	Sample Type:	Mod. Cal.
Project No.:	4953-10-1561	Sample Description:	Olive Brown Clayey Sand
Test Pit:	G-132	Avg. Dry Unit Weight (pcf):	102.0
Sample No.:	-	Avg. Initial Moisture Content (%):	20.9
Depth (ft):	15.5	Confining Pressure:	1.4, 2.9, 4.3 ksf

CU TRIAXIAL MULTI-STAGE TEST WITH PORE PRESSURE MEASUREMENT
ASTM D 4767



AP Engineering & Testing, Inc.



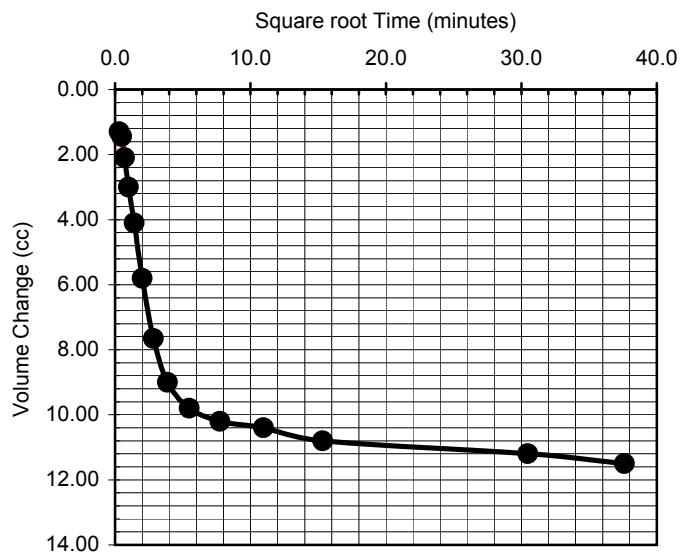
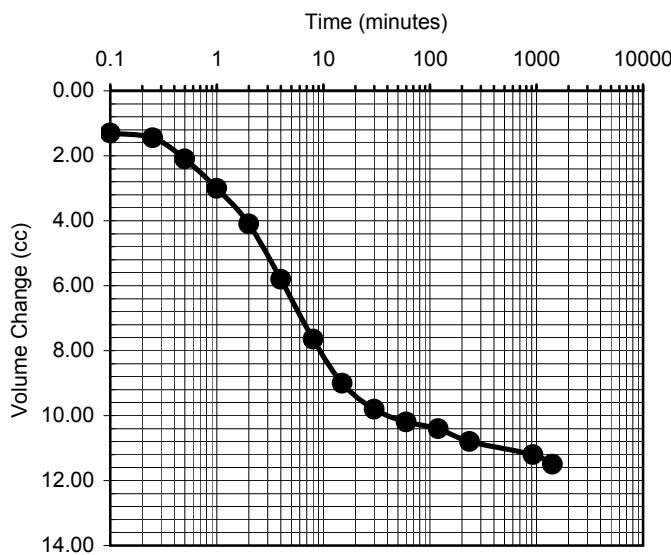
Project Name:	West Subway Extension	Sample Type:	Mod. Cal.
Project No.:	4953-10-1561	Sample Description:	Olive Brown Clayey Sand
Test Pit:	G-132	Avg. Dry Unit Weight (pcf):	102.0
Sample No.:	-	Avg. Initial Moisture Content (%):	20.9
Depth (ft):	15.5	Confining Pressure:	1.4, 2.9, 4.3 ksf

CU TRIAXIAL MULTI-STAGE TEST WITH PORE PRESSURE MEASUREMENT
ASTM D 4767

Figure D-2.17



AP Engineering & Testing, Inc.



Test Pit: G-132
Sample No.: -
Depth (feet): 15.5

Sample Type: Mod. Cal.
Soil Description: Olive Brown Clayey Sand
Eff. Confining Pressure (ksf): 2.9

Time (minutes)	Volume Change (cc)
0	0.0000
0.1	1.3000
0.25	1.4500
0.5	2.1000
1	3.0000
2	4.1000
4	5.8000
8	7.6500
15	9.0000
30	9.8000
60	10.2000
120	10.4000
235	10.8000
929	11.2000
1415	11.5000

SQRT Time (minutes)	Volume Change (cc)
0.0000	0.0000
0.3162	1.3000
0.5000	1.4500
0.7071	2.1000
1.0000	3.0000
1.4142	4.1000
2.0000	5.8000
2.8284	7.6500
3.8730	9.0000
5.4772	9.8000
7.7460	10.2000
10.9545	10.4000
15.3297	10.8000
30.4795	11.2000
37.6165	11.5000

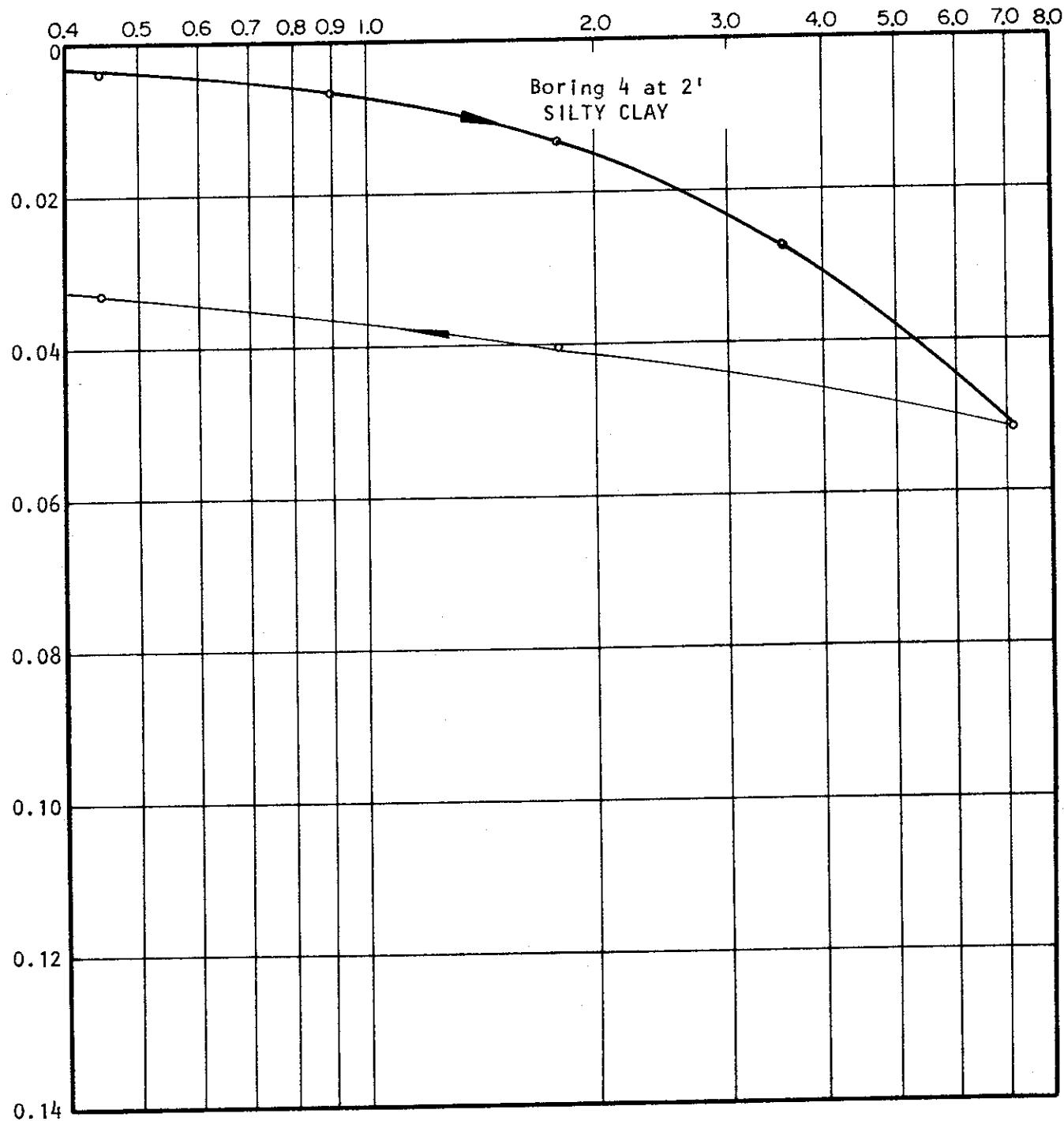
TIME RATE CONSOLIDATION CURVE
ASTM D 2435

Project Name: West Subway Extension
Project No.: 4953-10-1561
Date: 06/01/11

Figure D-2.18

A-78304

LOAD IN KIPS PER SQUARE FOOT

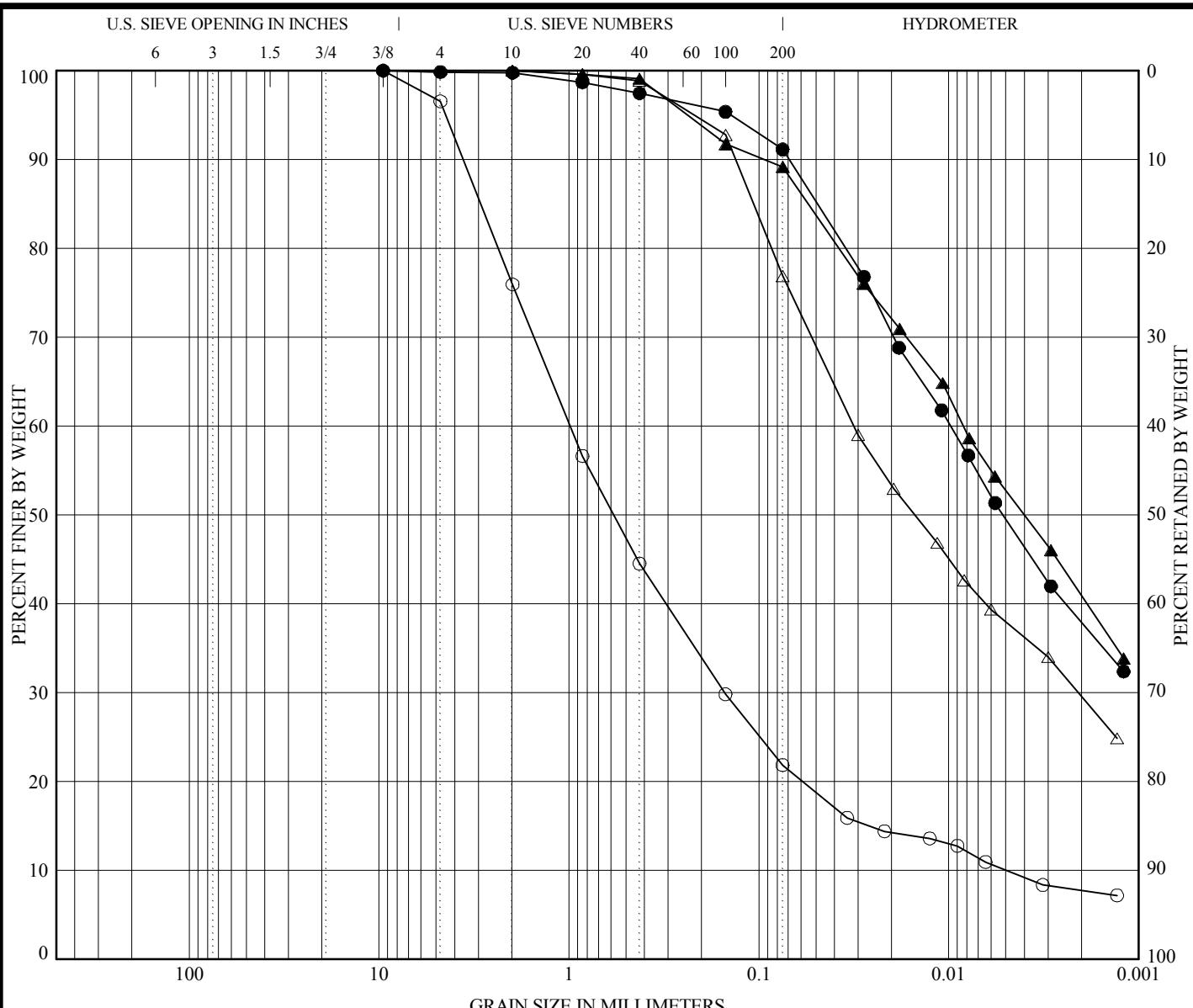


NOTE: Sample tested at field moisture content.

CONSOLIDATION TEST DATA

LeROY CRANDALL AND ASSOCIATES

Figure D-3.1



COBBLES	GRAVEL		SAND			SILT OR CLAY		
	coarse	fine	coarse	medium	fine			

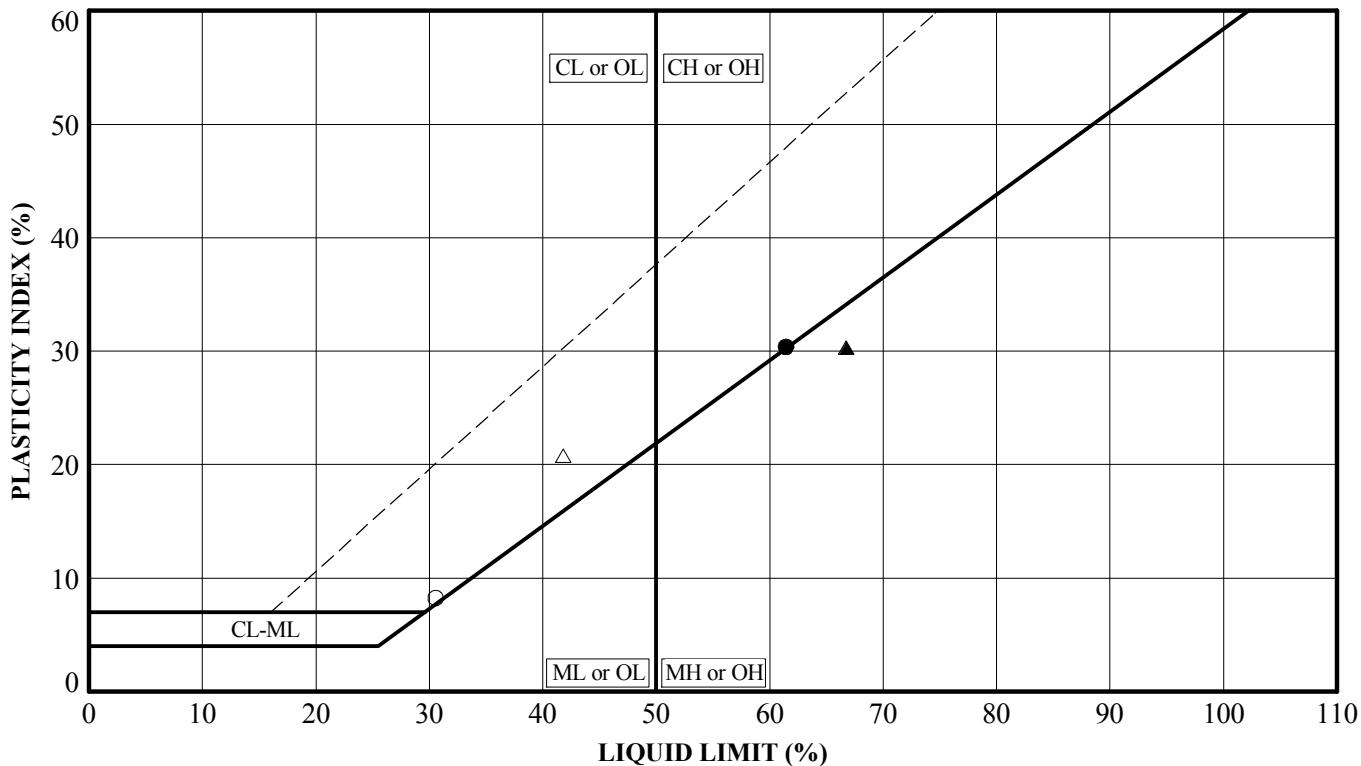
SYMBOL	BORING	DEPTH (ft)	CLASSIFICATION			LL (%)*	PL (%)*	PI (%)*	C _c	C _u
○	G-131	10.5	CLAYEY SAND (SC)			31	22	9	4.7	197.6
●	G-131	35.5	FAT CLAY (CH)			61	31	30	--	--
△	G-132	25.5	LEAN CLAY with SAND (CL)			42	21	21	--	--
▲	G-132	35.5	ELASTIC SILT (MH)			67	36	31	--	--

SYMBOL	BORING	DEPTH (ft)	D ₁₀₀ (mm)	D ₆₀ (mm)	D ₃₀ (mm)	D ₁₀ (mm)	% Gravel	% Sand	% Silt or % Clay
○	G-131	10.5	9.52	0.985	0.152	0.005	3.4	74.7	21.8
●	G-131	35.5	9.52	0.010	--	--	0.2	8.7	91.1
△	G-132	25.5	1.98	0.032	0.002	--	0.0	23.1	76.9
▲	G-132	35.5	1.98	0.008	--	--	0.0	10.8	89.2

Laboratory Test Method: ASTM D 422

*As determined by ASTM D 4318; see attached Atterberg Limits Test Results.

Prepared/Date: YN 8/30/2011
Checked/Date: LT 8/30/2011



Laboratory Test Method: ASTM D 4318

"NP" indicates Non-Plastic

Prepared/Date: YN 8/30/2011
Checked/Date: LT 8/30/2011

MTA Westside Subway Extension Los Angeles, California



ATTERBERG LIMITS TEST RESULTS
Project No.: 4953-10-1561
Figure: D-5

APPENDIX E

Table 1 - Laboratory Tests on Soil Samples

*AMEC E&I
 Westside Subway Extension
 Your #4953-10-1561, HDR|Schiff#11-0633LAB
 7-Jul-11*

Sample ID		G-131 @ 20' ML	G-132 @ 10' CL
Resistivity	Units		
as-received	ohm-cm	1,080	1,000
saturated	ohm-cm	1,080	1,000
pH		8.1	8.0
Electrical			
Conductivity	mS/cm	0.25	0.29
Chemical Analyses			
Cations			
calcium	Ca ²⁺	mg/kg	60
magnesium	Mg ²⁺	mg/kg	27
sodium	Na ¹⁺	mg/kg	198
potassium	K ¹⁺	mg/kg	12
Anions			
carbonate	CO ₃ ²⁻	mg/kg	27
bicarbonate	HCO ₃ ¹⁻	mg/kg	389
fluoride	F ¹⁻	mg/kg	6.0
chloride	Cl ¹⁻	mg/kg	15
sulfate	SO ₄ ²⁻	mg/kg	153
phosphate	PO ₄ ³⁻	mg/kg	0.8
Other Tests			
ammonium	NH ₄ ¹⁺	mg/kg	ND
nitrate	NO ₃ ¹⁻	mg/kg	0.5
sulfide	S ²⁻	qual	na
Redox		mV	na

Electrical conductivity in millisiemens/cm and chemical analysis were made on a 1:5 soil-to-water extract.
 mg/kg = milligrams per kilogram (parts per million) of dry soil.

Redox = oxidation-reduction potential in millivolts

ND = not detected

na = not analyzed

APPENDIX F



Certificate of Analysis

AMEC
6001 Rickenbacker Road
Los Angeles , CA 90040-3031

Project Number : Westside Extension, 4953111421
Report To : Jay Neuhaus
Reported : 09/14/2012

Client Sample ID E-120A-GW_Shallow Lab ID: 1203126-03

Volatile Organic Compounds by EPA 8260

Analyst: RP

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Styrene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:19	
tert-Amyl methyl ether	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:19	
tert-Butanol	ND	10	NA	1	B2I0091	09/07/2012	09/07/12 17:19	
tert-Butylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:19	
Tetrachloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:19	
Toluene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:19	
trans-1,2-Dichloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:19	
trans-1,3-Dichloropropene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:19	
Trichloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:19	
Trichlorofluoromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:19	
Vinyl acetate	ND	10	NA	1	B2I0091	09/07/2012	09/07/12 17:19	
Vinyl chloride	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:19	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>107 %</i>		<i>70 - 130</i>		B2I0091	09/07/2012	09/07/12 17:19	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>97.5 %</i>		<i>70 - 130</i>		B2I0091	09/07/2012	09/07/12 17:19	
<i>Surrogate: Dibromofluoromethane</i>	<i>108 %</i>		<i>70 - 130</i>		B2I0091	09/07/2012	09/07/12 17:19	
<i>Surrogate: Toluene-d8</i>	<i>103 %</i>		<i>70 - 130</i>		B2I0091	09/07/2012	09/07/12 17:19	

Semivolatile Organic Compounds by EPA 8270C

Analyst: BB

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,2,4-Trichlorobenzene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
1,2-Dichlorobenzene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
1,3-Dichlorobenzene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
1,4-Dichlorobenzene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
2,4,5-Trichlorophenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
2,4,6-Trichlorophenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
2,4-Dichlorophenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
2,4-Dimethylphenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
2,4-Dinitrophenol	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
2,4-Dinitrotoluene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
2,6-Dinitrotoluene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
2-Chloronaphthalene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
2-Chlorophenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
2-Methylnaphthalene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
2-Methylphenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
2-Nitroaniline	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 18:00	



Certificate of Analysis

AMEC
6001 Rickenbacker Road
Los Angeles , CA 90040-3031

Project Number : Westside Extension, 4953111421
Report To : Jay Neuhaus
Reported : 09/14/2012

Client Sample ID E-120A-GW_Shallow Lab ID: 1203126-03

Semivolatile Organic Compounds by EPA 8270C

Analyst: BB

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
2-Nitrophenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
3,3'-Dichlorobenzidine	ND	20	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
3-Nitroaniline	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
4,6-Dinitro-2-methyphenol	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
4-Bromophenyl-phenylether	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
4-Chloro-3-methylphenol	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
4-Chloroaniline	ND	20	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
4-Chlorophenyl-phenylether	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
4-Methylphenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
4-Nitroaniline	ND	20	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
4-Nitrophenol	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Acenaphthene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Acenaphthylene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Anthracene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Benzidine (M)	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Benzo(a)anthracene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Benzo(a)pyrene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Benzo(b)fluoranthene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Benzo(g,h,i)perylene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Benzo(k)fluoranthene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Benzoic acid	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Benzyl alcohol	ND	20	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
bis(2-chloroethoxy)methane	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
bis(2-Chloroethyl)ether	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
bis(2-chloroisopropyl)ether	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
bis(2-ethylhexyl)phthalate	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Butylbenzylphthalate	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Chrysene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Di-n-butylphthalate	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Di-n-octylphthalate	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Dibenz(a,h)anthracene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Dibenzofuran	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Diethyl phthalate	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Dimethyl phthalate	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Fluoranthene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Fluorene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Hexachlorobenzene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	



Certificate of Analysis

AMEC

6001 Rickenbacker Road
Los Angeles , CA 90040-3031

Project Number : Westside Extension, 4953111421

Report To : Jay Neuhaus
Reported : 09/14/2012

Client Sample ID E-120A-GW_Shallow

Lab ID: 1203126-03

Semivolatile Organic Compounds by EPA 8270C

Analyst: BB

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Hexachlorobutadiene	ND	20	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Hexachlorocyclopentadiene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Hexachloroethane	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Indeno(1,2,3-cd)pyrene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Isophorone	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
N-Nitroso-di-n propylamine	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
N-Nitrosodiphenylamine	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Naphthalene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Nitrobenzene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Pentachlorophenol	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Phenanthrene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Phenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Pyrene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
Pyridine	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 18:00	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	73.1 %		37 - 93		B2I0044	09/05/2012	09/06/12 18:00	
<i>Surrogate: 2,4,6-Tribromophenol</i>	98.7 %		46 - 125		B2I0044	09/05/2012	09/06/12 18:00	
<i>Surrogate: 2-Chlorophenol-d4</i>	66.2 %		36 - 83		B2I0044	09/05/2012	09/06/12 18:00	
<i>Surrogate: 2-Fluorobiphenyl</i>	79.2 %		51 - 100		B2I0044	09/05/2012	09/06/12 18:00	
<i>Surrogate: 2-Fluorophenol</i>	43.1 %		17 - 56		B2I0044	09/05/2012	09/06/12 18:00	
<i>Surrogate: 4-Terphenyl-d14</i>	93.7 %		58 - 113		B2I0044	09/05/2012	09/06/12 18:00	
<i>Surrogate: Nitrobenzene-d5</i>	77.0 %		39 - 95		B2I0044	09/05/2012	09/06/12 18:00	
<i>Surrogate: Phenol-d5</i>	33.8 %		13 - 45		B2I0044	09/05/2012	09/06/12 18:00	

1,4-Dioxane by EPA 8270/SIM: Isotope Dilution Technique

Analyst: BB

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,4-Dioxane	ND	0.20	NA	1	B2I0203	09/11/2012	09/11/12 19:30	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	87.1 %		36 - 107		B2I0203	09/11/2012	09/11/12 19:30	
<i>Surrogate: 2-Fluorobiphenyl</i>	104 %		42 - 120		B2I0203	09/11/2012	09/11/12 19:30	
<i>Surrogate: 4-Terphenyl-d14</i>	94.0 %		67 - 142		B2I0203	09/11/2012	09/11/12 19:30	
<i>Surrogate: Nitrobenzene-d5</i>	57.6 %		36 - 130		B2I0203	09/11/2012	09/11/12 19:30	



Certificate of Analysis

AMEC
6001 Rickenbacker Road
Los Angeles , CA 90040-3031

Project Number : Westside Extension, 4953111421
Report To : Jay Neuhaus
Reported : 09/14/2012

Client Sample ID E-120A-GW_Shallow Lab ID: 1203126-03

pH by EPA 9040B

Analyst: CB

Analyte	Result (pH Units)	PQL (pH Units)	MDL (pH Units)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
pH	7.0	0.10	NA	1	B2I0050	09/05/2012	09/05/12 17:40	



American Environmental Testing Laboratory Inc.

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Ordered By

Advanced Technology Laboratories
3275 Walnut Street
Signal Hill, CA 90755-5225

Number of Pages 2

Date Received 09/06/2012

Date Reported 09/13/2012

Telephone: (562)989-4045
Attention: Rachelle Arada

Job Number	Order Date	Client
66762	09/06/2012	ATL

Project ID: 1203126
Project Name: PO# SC07478

Enclosed please find results of analyses of 4 water samples which were analyzed as specified on the attached chain of custody. If there are any questions, please do not hesitate to call.

Checked By:

Approved By:

Cyrus Razmara, Ph.D.
Laboratory Director



American Environmental Testing Laboratory Inc.

2834 & 2908 North Naomi Street Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181

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Page: 1 A

Ordered By

Advanced Technology Laboratories
3275 Walnut Street
Signal Hill, CA 90755-5225

Project ID: 1203126

Date Received 09/06/2012

Date Reported 09/13/2012

Telephone: (562) 989-4045
Attention: Rachelle Arada

Job Number	Order Date	Client
66762	09/06/2012	ATL

CERTIFICATE OF ANALYSIS CASE NARRATIVE

AETL received 4 samples with the following specification on 09/06/2012.

Lab ID	Sample ID	Sample Date	Matrix	QTY of Containers
66762.01	1203126-01	09/05/2012	Aqueous	1
66762.02	1203126-02	09/05/2012	Aqueous	1
66762.03	1203126-03	09/05/2012	Aqueous	1
66762.04	1203126-05	09/05/2012	Aqueous	1

The samples were analyzed as specified on the enclosed chain of custody.
No analytical non-conformances were encountered.

Checked By: _____

Approved By: _____

Cyrus Razmara, Ph.D.
Laboratory Director

Page 109 of 120



American Environmental Testing Laboratory Inc.

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ANALYTICAL RESULTS

Ordered By

Advanced Technology Laboratories
3275 Walnut Street
Signal Hill, CA 90755-5225

Telephone: (562)989-4045

Attn: Rachelle Arada

Page: 2

Project ID: 1203126

Project Name: PO# SC07478

AETL Job Number	Submitted	Client
66762	09/06/2012	ATL

Method: 310.1, Alkalinity, Titrimetric (pH 4.5), (EPA/600/4-79-020)

QC Batch No: 091212-1

Our Lab I.D.		Method Blank	66762.01	66762.02	66762.03	66762.04
Client Sample I.D.			1203126-01	1203126-02	1203126-03	1203126-05
Date Sampled			09/05/2012	09/05/2012	09/05/2012	09/05/2012
Date Prepared		09/12/2012	09/12/2012	09/12/2012	09/12/2012	09/12/2012
Preparation Method		310.1	310.1	310.1	310.1	310.1
Date Analyzed		09/12/2012	09/12/2012	09/12/2012	09/12/2012	09/12/2012
Matrix		Aqueous	Aqueous	Aqueous	Aqueous	Aqueous
Units		mg/L	mg/L	mg/L	mg/L	mg/L
Dilution Factor		1	1	1	1	1
Analytes	MDL	PQL	Results	Results	Results	Results
Alkalinity, Bicarbonate	2.0	2.0	ND	540	580	570
Alkalinity, Carbonate	2.0	2.0	ND	ND	ND	ND
Alkalinity, Hydroxide	2.0	2.0	ND	ND	ND	ND
Alkalinity, Total	2.0	2.0	ND	540	580	570

QUALITY CONTROL REPORT

QC Batch No: 091212-1; Dup or Spiked Sample: 66762.01; LCS: Clean Water; QC Prepared: 09/12/2012; QC Analyzed: 09/12/2012;
Units: mg/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Alkalinity, Bicarbonate	540	20.0	560	100	20.0	560	100	<1	80-120	<15
Alkalinity, Total	540	20.0	560	100	20.0	560	100	<1	80-120	<15

QC Batch No: 091212-1; Dup or Spiked Sample: 66762.01; LCS: Clean Water; QC Prepared: 09/12/2012; QC Analyzed: 09/12/2012;
Units: mg/L

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
Alkalinity, Bicarbonate	540	550	1.8	<15	20.0	20.0	100	80-120		
Alkalinity, Total	540	550	1.8	<15	20.0	20.0	100	80-120		



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Data Qualifiers and Descriptors

Data Qualifier:

- #: Recovery is not within acceptable control limits.
- *: In the QC section, sample results have been taken directly from the ICP reading. No preparation factor has been applied.
- B: Analyte was present in the Method Blank.
- D: Result is from a diluted analysis.
- E: Result is beyond calibration limits and is estimated.
- H: Analysis was performed over the allowed holding time due to circumstances which were beyond laboratory control.
- J: Analyte was detected . However, the analyte concentration is an estimated value, which is between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL).
- M: Matrix spike recovery is outside control limits due to matrix interference. Laboratory Control Sample recovery was acceptable.
- MCL: Maximum Contaminant Level
- NS: No Standard Available
- S6: Surrogate recovery is outside control limits due to matrix interference.
- S8: The analysis of the sample required a dilution such that the surrogate concentration was diluted below the method acceptance criteria.
- X: Results represent LCS and LCSD data.

Definition:

- %Limi: Percent acceptable limits.
- %REC: Percent recovery.
- Con.L: Acceptable Control Limits
- Conce: Added concentration to the sample.
- LCS: Laboratory Control Sample
- MDL: Method Detection Limit is a statistically derived number which is specific for each instrument; each method, and each compound. It indicates a distinctively detectable quantity with 99% probability.



American Environmental Testing Laboratory Inc.

2834 & 2908 North Naomi Street, Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181
Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com

Data Qualifiers and Descriptors

MS: Matrix Spike

MS DU: Matrix Spike Duplicate

ND: Analyte was not detected in the sample at or above MDL.

PQL: Practical Quantitation Limit or ML (Minimum Level as per RWQCB) is the minimum concentration that can be quantified with more than 99% confidence. Taking into account all aspects of the entire analytical instrumentation and practice.

Recov: Recovered concentration in the sample.

RPD: Relative Percent Difference

ADVANCED  TECHNOLOGY
LABORATORIES

SUBCONTRACT ORDER

Work Order: 1203126

Job # 66762

SENDING LABORATORY:

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Phone: 562.989.4045
Fax: 562.989.6348
Project Manager: Rachelle Arada

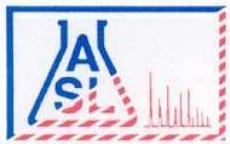
RECEIVING LABORATORY:

AETL
2834 North Naomi Street
Burbank, CA 91504
Phone :(818) 845-8200
Fax: (818) 845-8840
PO#: SC07478 - Standard TAT *(AP)*

IMPORTANT : Please include Work Order # and PO # in your invoice.

Analysis	Due	Expires	Sampled	Comments
ATL Lab#: 1203126-01 / E-122A-GW 310.1_2320B_Total_SUB	09/12/12 17:00	09/19/12 09:30	Groundwater	09/05/12 09:30 <i>66762-01</i> Report Carbonate
ATL Lab#: 1203126-02 / S-106-GW 310.1_2320B_Total_SUB	09/12/12 17:00	09/19/12 08:30	Groundwater	09/05/12 08:30 <i>66762-02</i>
ATL Lab#: 1203126-03 / E-120A-GW_Shallow 310.1_2320B_Total_SUB	09/12/12 17:00	09/19/12 00:00	Groundwater	09/05/12 00:00 <i>66762-03</i>
ATL Lab#: 1203126-05 / QCEB_9/5/12 310.1_2320B_Total_SUB	09/12/12 17:00	09/19/12 13:00	Aqueous	09/05/12 13:00 <i>66762-04</i>

<i>fl</i> Released By	<i>09/05/12</i> Date	<i>C</i> Received By	<i>09/06/12 1130</i> Date
<i>carl</i> Released By	<i>09/06/12</i> Date	<i>240</i> Received By	<i>09/06/12 1240</i> Date



AMERICAN SCIENTIFIC LABORATORIES, LLC

Environmental Testing Services

2520 N. San Fernando Rd., Los Angeles, CA 90065 Tel: (323) 223-9700 Fax: (323) 223-9500

Ordered By

Advanced Technology Laboratories
3275 Walnut Ave.
Signal Hill, CA 90755-5225

Number of Pages 3

Date Received 09/06/2012

Date Reported 09/13/2012

Telephone (562) 989-4045
Attn Rachelle Arada

Job Number	Ordered	Client
54658	09/06/2012	ATL

Project ID: 1203126

Project Name:

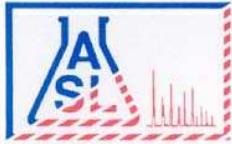
Enclosed are the results of analyses on 4 samples analyzed as specified on attached chain of custody.

A handwritten signature in black ink, appearing to read "Amolk MOLKY Brar".

Amolk MOLKY Brar
Laboratory Manager

American Scientific Laboratories, LLC (ASL) accepts sample materials from clients for analysis with the assumption that all of the information provided to ASL verbally or in writing by our clients (and/or their agents), regarding samples being submitted to ASL, is complete and accurate. ASL accepts all samples subject to the following conditions:

- 1) ASL is not responsible for verifying any client-provided information regarding any samples submitted to the laboratory.
- 2) ASL is not responsible for any consequences resulting from any inaccuracies, omissions, or misrepresentations contained in client-provided information regarding samples submitted to the laboratory.



AMERICAN SCIENTIFIC LABORATORIES, LLC
Environmental Testing Services

2520 N. San Fernando Rd., Los Angeles, CA 90065 Tel: (323) 223-9700 Fax: (323) 223-9500

ANALYTICAL RESULTS

Ordered By

Advanced Technology Laboratories
3275 Walnut Ave.
Signal Hill, CA 90755-5225

Telephone: (562)989-4045

Attn: Rachelle Arada

Page: **2**

Project ID: 1203126

ASL Job Number	Submitted	Client
54658	09/06/2012	ATL

Method: SM5210B, Biochemical Oxygen Demand (BOD)

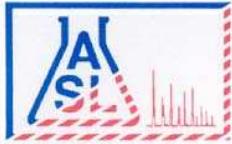
QC Batch No: 091212-1

Our Lab I.D.		287931	287932	287933		
Client Sample I.D.		1203126-01	1203126-02	1203126-03		
Date Sampled		09/05/2012	09/05/2012	09/05/2012		
Date Prepared		09/07/2012	09/07/2012	09/07/2012		
Preparation Method						
Date Analyzed		09/12/2012	09/12/2012	09/12/2012		
Matrix		Groundwater	Groundwater	Groundwater		
Units		mg/L	mg/L	mg/L		
Dilution Factor		1	1	1		
Analytes	PQL	Results	Results	Results		
Conventional s						
BOD @ 20C	5.00	ND	ND	ND		

QUALITY CONTROL REPORT

QC Batch No: 091212-1

Analytes	LCS % REC	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit					
Conventional s										
BOD @ 20C	97	94	3.2	80-120	20					



AMERICAN SCIENTIFIC LABORATORIES, LLC

Environmental Testing Services

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ANALYTICAL RESULTS

Ordered By

Advanced Technology Laboratories
3275 Walnut Ave.
Signal Hill, CA 90755-5225

Telephone: (562)989-4045

Attn: Rachelle Arada

Page: 3

Project ID: 1203126

ASL Job Number	Submitted	Client
54658	09/06/2012	ATL

Method: SM5210B, Biochemical Oxygen Demand (BOD)

QC Batch No: 091212-1

Our Lab I.D.		287934					
Client Sample I.D.		1203126-05					
Date Sampled		09/05/2012					
Date Prepared		09/07/2012					
Preparation Method							
Date Analyzed		09/12/2012					
Matrix		Water					
Units		mg/L					
Dilution Factor		1					
Analytes	PQL	Results					
Conventional s							
BOD @ 20C	5.00	ND					

QUALITY CONTROL REPORT

QC Batch No: 091212-1

Analytes	LCS % REC	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit					
Conventional s										
BOD @ 20C	97	94	3.2	80-120	20					

ADVANCED TECHNOLOGY
LABORATORIES
SUBCONTRACT ORDER

Work Order: 1203126

ASL JOB # 54658

SENDING LABORATORY:

Advanced Technology Laboratories
 3275 Walnut Avenue
 Signal Hill, CA 90755
 Phone: 562.989.4045
 Fax: 562.989.6348
 Project Manager: Rachelle Arada

RECEIVING LABORATORY:

American Scientific Laboratories
 2520 N. San Fernando Rd.
 Los Angeles, CA 90065
 Phone :(323) 223-9700
 Fax: (323) 223-9500
 PO#: SC07479 Standard TAT (RA)

IMPORTANT : Please include Work Order # and PO # in your invoice.

Analysis	Due	Expires	Sampled	Comments	Lab. I.D.
ATL Lab#: 1203126-01 / E-122A-GW 405.1_5210B	09/20/12 17:00	09/07/12 09:30	Groundwater	09/05/12 09:30	287931
ATL Lab#: 1203126-02 / S-106-GW 405.1_5210B	09/20/12 17:00	09/07/12 08:30	Groundwater	09/05/12 08:30	287932
ATL Lab#: 1203126-03 / E-120A-GW_Shallow 405.1_5210B	09/20/12 17:00	09/07/12 00:00	Groundwater	09/05/12 00:00	287933
ATL Lab#: 1203126-05 / QCEB_9/5/12 405.1_5210B	09/20/12 17:00	09/07/12 13:00	Aqueous	09/05/12 13:00	287934


 Released By

9/6/12
 Date


 Received By

9-6-12
 Date

14:45
 Date

Released By

Date

Received By

Date

CHAIN OF CUSTODY RECORD

ADVANCED TECHNOLOGY LABORATORIES 3275 Walnut Ave., Signal Hill, CA 90755 Tel: (562) 989-4045 • Fax: (562) 989-4040		P.O.#: _____ Quote #: _____ Logged By: _____ Date: _____ NOTE: Please include your Quote No. to ensure proper pricing of your project.	
Client: <u>AMC</u> Attn: <u>Jay Velez-Hicks</u>		Address: <u>5608 C. Dawson Ave</u> State: <u>CA</u> Zip Code: <u>90040</u> City: <u>LA</u> <u>Signature</u> Sampler: <u>(Printed Name)</u> <u>(Signature)</u>	
Project Name: <u>Westside Extension</u> Relinquished by: (Signature and Printed Name) <u>Dawn Davis</u> Relinquished by: (Signature and Printed Name) <u>Dawn Davis</u> Relinquished by: (Signature and Printed Name) <u>Dawn Davis</u>		Project #: <u>4953111421</u> Date: <u>9/5/12</u> Time: <u>16:20</u> Received by: <u>(Signature and Printed Name)</u> <u>(Signature)</u> Received by: <u>(Signature and Printed Name)</u> <u>(Signature)</u> Received by: <u>(Signature and Printed Name)</u> <u>(Signature)</u>	
I hereby authorize ATL to perform the work indicated below: Project Mgr/Submitter: <u>Paul C. 9/5/12</u> Print Name: <u>Paul C.</u> Date: <u>9/5/12</u> Signature: <u>Paul C.</u>		Send Report To: Attn: _____ Co: _____ Addr: _____ City: _____ State: _____ Zip: _____	
Sample/Records - Archival & Disposal Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report. Storage Fees (applies when storage is requested): • Sample : \$2.00 / sample / mo (after 45 days) • Records : \$1.00 / ATL worker/ mo (after 1 year)		Method of Transport <input checked="" type="checkbox"/> ATL <input type="checkbox"/> Client <input type="checkbox"/> FedEx <input type="checkbox"/> GSO <input type="checkbox"/> Other: _____	
Sample Description Lab No. Sample I.D. / Location Date Time		Method of Transport <input checked="" type="checkbox"/> ATL <input type="checkbox"/> Client <input type="checkbox"/> FedEx <input type="checkbox"/> GSO <input type="checkbox"/> Other: _____	
1203/26-01 E-182A-GW 9/5/12 0930 1203/26-02 E-180A-GW 9/5/12 0830 - 03 E-180A-GW Shallow 9/5/12 X - 04 QCTB-9/5/12 9/5/12 X - 05 QCTB-9/5/12 9/5/12 X See Sample #1 Run Matrix		1. CHILLED & F. 5.1 Y N 4. SEALED 2. HEADSPACE (VOA) Y N 5. # OF SPLS/MATCH COC Y N 3. CONTAINER INTACT Y N 6. PRESERVED Y N	
TAT: <input type="checkbox"/> A= Overnight <input type="checkbox"/> B= Emergency samples received after 5 p.m.		C= Critical <input type="checkbox"/> D= Urgent 2 Workdays <input type="checkbox"/> 3 Workdays	
Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal		Routine <input checked="" type="checkbox"/> = 7 Workdays Preservatives: H=HCl N=HNO ₃ S=H ₂ SO ₄ C=4°C Z=Zn(AC) ₂ O=NaOH T=Na ₂ SO ₃	
DISTRIBUTION: White with report, Yellow to folder, Pink to submitter.			

Figure F-1.41

• TAT starts 8 a.m. following day if samples received after 5 p.m.

Preservatives:
 H=HCl N=HNO₃ S=H₂SO₄ C=4°C
 Z=Zn(AC)₂ O=NaOH T=Na₂SO₃

9/5/12

Groundwater Sample Analysis Contract List

Westside Subway Extension Project

AMEC Project No. 4953111421.13

PO# C012500708

Analytes	Method	
dissolved methane	RSKSOP-175	
Total sulfide and dissolved hydrogen sulfide	SM-4500-S=D	
sulfate, chloride, nitrate	EPA 300.0	
total dissolved solids	SM 2540C	
total suspended solids	SM 2540D	
pH	EPA 9040	
TLC dissolved metals	total metals	EPA 6010B/7000 series
mercury, dissolved,	+ mercury	EPA 7470A by cold vapor
TRPH		EPA 1664 SGT/HEM
TPH - DRO & ORO		EPA 8015M/3520C
TPH - gasoline		EPA 8015M/5030B
SVOCs by GC/MS		EPA 8270C/3520C
VOCs by GC/MS including BTEX		EPA 8260B/3050B
oil & grease		EPA 1664
alkalinity		SM 2320B
pesticides		EPA 8081
PCBs		EPA 8082
Trip blanks		EPA 8260

Hold bottles for:

Hardness, Barium

1:4 = D.Oxane

BOD

Settiable Solids

Nitrate, perchlorate

(P14)



September 17, 2012



Jay Neuhaus
AMEC
6001 Rickenbacker Road
Los Angeles, CA 90040-3031
Tel: (323) 889-5300
Fax:(323) 721-6700

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196
ORELAP No.: CA300003
TCEQ No.: T104704502

Re: ATL Work Order Number : 1203138

Client Reference : Westside Extension, 4953111421

Enclosed are the results for sample(s) received on September 06, 2012 by Advanced Technology Laboratories. The sample(s) are tested for the parameters as indicated on the enclosed chain of custody in accordance with applicable laboratory certifications. The laboratory results contained in this report specifically pertains to the sample(s) submitted.

Thank you for the opportunity to serve the needs of your company. If you have any questions, please feel free to contact me or your Project Manager.

Sincerely,

A handwritten signature in black ink, appearing to read 'Eddie Rodriguez'.

Eddie Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and its absence renders the report invalid. Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or applicable state-specific certification programs. The report cannot be reproduced without written permission from the client and Advanced Technology Laboratories.

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www.atlglobal.com



Certificate of Analysis

AMEC	Project Number : Westside Extension, 4953111421
6001 Rickenbacker Road	Report To : Jay Neuhaus
Los Angeles , CA 90040-3031	Reported : 09/17/2012

SUMMARY OF SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
E-120A-GW_Deep	1203138-01	Groundwater	9/06/12 11:15	9/06/12 13:45
G-109-GW_Deep	1203138-02	Groundwater	9/06/12 13:10	9/06/12 13:45
QCEB_9/6/12	1203138-03	Aqueous	9/06/12 13:20	9/06/12 13:45
G-109-GW_Shallow	1203138-04	Groundwater	9/06/12 12:30	9/06/12 13:45

CASE NARRATIVE

The samples for SM5210 (BOD) were subcontracted to American Scientific Laboratories with ELAP Cert.# 2200.

The samples for SM 2320B (Alkalinity, Carbonate) analysis were subcontracted to AETL with DOHS Cert.#1541.

Sample Receiving/General Comments

Headspace >5-6mm was noted on all voa vials for sample G-109-GW_Shallow.

Both voa vials for sample QCTB_9/6/12 were received empty with no water sample.

The voa vials for sample QCEB_9/6/12 were not labeled individually, the ID was labeled on the ziplock they came in from.



Certificate of Analysis

AMEC
6001 Rickenbacker Road
Los Angeles , CA 90040-3031

Project Number : Westside Extension, 4953111421
Report To : Jay Neuhaus
Reported : 09/17/2012

Client Sample ID E-120A-GW_Deep Lab ID: 1203138-01

Anions Scan by Ion Chromatography EPA 300.0

Analyst: AG

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Chloride	110	10	NA	20	B2I0104	09/07/2012	09/07/12 15:56	
Nitrate as N	ND	0.10	NA	1	B2I0104	09/07/2012	09/07/12 12:19	
Nitrite, as N	ND	0.10	NA	1	B2I0104	09/07/2012	09/07/12 12:19	
Sulfate	210	20	NA	20	B2I0104	09/07/2012	09/07/12 15:56	

Perchlorate by IC EPA 314.0

Analyst: AG

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Perchlorate	ND	2.0	NA	1	B2I0198	09/11/2012	09/11/12 10:57	

Oil & Grease, Hexane Extractable Material (HEM) EPA 1664A

Analyst: LA

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Oil & Grease, HEM	ND	2.3	NA	1	B2I0215	09/11/2012	09/11/12 00:00	

Total Petroleum Hydrocarbons, HEM/SGT EPA 1664A

Analyst: LA

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Total Petroleum Hydrocarbons	ND	2.3	NA	1	B2I0222	09/11/2012	09/11/12 00:00	

Dissolved Gases in Water

Analyst: BB

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Methane	4.7	1.0	NA	1	B2I0139	09/10/2012	09/10/12 13:42	

Hardness by Calculation by SM 2340B

Analyst: KT/SB

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Hardness Total (As CaCO3)	580	2.0	NA	1	B2I0202	09/11/2012	09/12/12 14:40	



Certificate of Analysis

AMEC
6001 Rickenbacker Road
Los Angeles , CA 90040-3031

Project Number : Westside Extension, 4953111421
Report To : Jay Neuhaus
Reported : 09/17/2012

Client Sample ID E-120A-GW_Deep Lab ID: 1203138-01

Total Dissolved Solids (Residue, Filterable) by SM 2540C

Analyst: AG

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Residue, Dissolved	1000	10	10	1	B2I0210	09/12/2012	09/12/12 11:00	

Total Suspended Solids (Residue, Non-Filtrable) by SM 2540D

Analyst: AG

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Residue, Suspended	ND	10	10	1	B2I0200	09/11/2012	09/11/12 11:00	

Residue, Settleable by SM 2540F

Analyst: AG

Analyte	Result (mL/L)	PQL (mL/L)	MDL (mL/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Residue, Settleable	ND	0.10	NA	1	B2I0115	09/07/2012	09/07/12 10:10	

Sulfide, Total by SM 4500-S=D

Analyst: LA

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Sulfide, Total	ND	0.01	NA	1	B2I0155	09/10/2012	09/10/12 11:59	

Sulfide, Dissolved by SM 4500-S=D

Analyst: LA

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Hydrogen sulfide	ND	0.01	NA	1	B2I0110	09/07/2012	09/07/12 11:57	

Total Metals by ICP-AES EPA 6010B

Analyst: KT/SB

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Boron	0.39	0.10	NA	1	B2I0202	09/11/2012	09/12/12 14:40	

Title 22 Metals by ICP-AES EPA 6010B

Analyst: KT/SB

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Antimony	ND	0.005	NA	1	B2I0202	09/11/2012	09/12/12 14:40	



Certificate of Analysis

AMEC

6001 Rickenbacker Road
Los Angeles , CA 90040-3031

Project Number : Westside Extension, 4953111421

Report To : Jay Neuhaus
Reported : 09/17/2012

Client Sample ID E-120A-GW_Deep

Lab ID: 1203138-01

Title 22 Metals by ICP-AES EPA 6010B

Analyst: KT/SB

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Arsenic	ND	0.01	NA	1	B2I0202	09/11/2012	09/12/12 14:40	
Barium	0.16	0.003	NA	1	B2I0202	09/11/2012	09/12/12 14:40	
Beryllium	ND	0.003	NA	1	B2I0202	09/11/2012	09/12/12 14:40	
Cadmium	ND	0.003	NA	1	B2I0202	09/11/2012	09/12/12 14:40	
Chromium	ND	0.003	NA	1	B2I0202	09/11/2012	09/12/12 14:40	
Cobalt	ND	0.003	NA	1	B2I0202	09/11/2012	09/12/12 14:40	
Copper	0.02	0.005	NA	1	B2I0202	09/11/2012	09/12/12 14:40	
Lead	ND	0.005	NA	1	B2I0202	09/11/2012	09/12/12 14:40	
Molybdenum	0.01	0.005	NA	1	B2I0202	09/11/2012	09/12/12 14:40	
Nickel	ND	0.005	NA	1	B2I0202	09/11/2012	09/12/12 14:40	
Selenium	ND	0.01	NA	1	B2I0202	09/11/2012	09/12/12 14:40	
Silver	ND	0.003	NA	1	B2I0202	09/11/2012	09/12/12 14:40	
Thallium	ND	0.02	NA	1	B2I0202	09/11/2012	09/12/12 14:40	
Vanadium	ND	0.003	NA	1	B2I0202	09/11/2012	09/12/12 14:40	
Zinc	ND	0.01	NA	1	B2I0202	09/11/2012	09/12/12 14:40	

Mercury by AA (Cold Vapor) EPA 7470

Analyst: VV

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Mercury	ND	0.20	NA	1	B2I0217	09/11/2012	09/12/12 15:05	

Gasoline Range Organics by EPA 8015B

Analyst: LT

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Gasoline Range Organics	ND	0.05	NA	1	B2I0145	09/10/2012	09/10/12 17:51	
<i>Surrogate: 4-Bromofluorobenzene</i>	92.0 %		70 - 130		B2I0145	09/10/2012	09/10/12 17:51	

Diesel Range Organics by EPA 8015B

Analyst: MR

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
DRO	0.07	0.05	NA	1	B2I0171	09/10/2012	09/11/12 02:48	
ORO	0.13	0.05	NA	1	B2I0171	09/10/2012	09/11/12 02:48	
<i>Surrogate: p-Terphenyl</i>	112 %		48 - 124		B2I0171	09/10/2012	09/11/12 02:48	



Certificate of Analysis

AMEC
6001 Rickenbacker Road
Los Angeles , CA 90040-3031

Project Number : Westside Extension, 4953111421
Report To : Jay Neuhaus
Reported : 09/17/2012

Client Sample ID E-120A-GW_Deep Lab ID: 1203138-01

Organochlorine Pesticides by EPA 8081

Analyst: PT

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
4,4'-DDD	ND	0.05	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
4,4'-DDE	ND	0.05	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
4,4'-DDT	ND	0.05	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
Aldrin	ND	0.02	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
alpha-BHC	ND	0.02	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
alpha-Chlordane	ND	0.02	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
beta-BHC	ND	0.02	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
Chlordane	ND	0.25	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
delta-BHC	ND	0.02	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
Dieldrin	ND	0.05	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
Endosulfan I	ND	0.02	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
Endosulfan II	ND	0.05	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
Endosulfan sulfate	ND	0.05	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
Endrin	ND	0.05	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
Endrin aldehyde	ND	0.05	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
Endrin ketone	ND	0.05	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
gamma-BHC	ND	0.02	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
gamma-Chlordane	ND	0.02	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
Heptachlor	ND	0.02	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
Heptachlor epoxide	ND	0.02	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
Methoxychlor	ND	0.25	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
Toxaphene	ND	2.5	NA	1	B2I0281	09/13/2012	09/13/12 17:06	
<i>Surrogate: Decachlorobiphenyl</i>	104 %		23 - 121		B2I0281	09/13/2012	09/13/12 17:06	
<i>Surrogate: Tetrachloro-m-xylene</i>	93.2 %		55 - 109		B2I0281	09/13/2012	09/13/12 17:06	



Certificate of Analysis

AMEC
6001 Rickenbacker Road
Los Angeles , CA 90040-3031

Project Number : Westside Extension, 4953111421
Report To : Jay Neuhaus
Reported : 09/17/2012

Client Sample ID E-120A-GW_Deep Lab ID: 1203138-01

Polychlorinated Biphenyls by EPA 8082

Analyst: PT

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Aroclor 1016	ND	0.50	NA	1	B2I0281	09/13/2012	09/13/12 16:37	
Aroclor 1221	ND	1.0	NA	1	B2I0281	09/13/2012	09/13/12 16:37	
Aroclor 1232	ND	0.50	NA	1	B2I0281	09/13/2012	09/13/12 16:37	
Aroclor 1242	ND	0.50	NA	1	B2I0281	09/13/2012	09/13/12 16:37	
Aroclor 1248	ND	0.50	NA	1	B2I0281	09/13/2012	09/13/12 16:37	
Aroclor 1254	ND	0.50	NA	1	B2I0281	09/13/2012	09/13/12 16:37	
Aroclor 1260	ND	0.50	NA	1	B2I0281	09/13/2012	09/13/12 16:37	
Aroclor 1262	ND	0.50	NA	1	B2I0281	09/13/2012	09/13/12 16:37	
Aroclor 1268	ND	0.50	NA	1	B2I0281	09/13/2012	09/13/12 16:37	
<i>Surrogate: Decachlorobiphenyl</i>	<i>104 %</i>		<i>41 - 106</i>		B2I0281	09/13/2012	<i>09/13/12 16:37</i>	
<i>Surrogate: Tetrachloro-m-xylene</i>	<i>90.0 %</i>		<i>48 - 108</i>		B2I0281	09/13/2012	<i>09/13/12 16:37</i>	

Volatile Organic Compounds by EPA 8260

Analyst: RP

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,1,1,2-Tetrachloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,1,1-Trichloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,1,2,2-Tetrachloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,1,2-Trichloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,1-Dichloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,1-Dichloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,1-Dichloropropene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,2,3-Trichloropropane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,2,3-Trichlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,2,4-Trichlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,2,4-Trimethylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,2-Dibromo-3-chloropropane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,2-Dibromoethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,2-Dichlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,2-Dichloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,2-Dichloropropane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,3,5-Trimethylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,3-Dichlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,3-Dichloropropane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
1,4-Dichlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
2,2-Dichloropropane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	



Certificate of Analysis

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Project Number : Westside Extension, 4953111421
Report To : Jay Neuhaus
Reported : 09/17/2012

Client Sample ID E-120A-GW_Deep Lab ID: 1203138-01

Volatile Organic Compounds by EPA 8260

Analyst: RP

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
2-Chloroethyl vinyl ether	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
2-Chlorotoluene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
4-Chlorotoluene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
4-Isopropyltoluene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Benzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Bromobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Bromochloromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Bromodichloromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Bromoform	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Bromomethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Carbon disulfide	ND	1.0	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Carbon tetrachloride	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Chlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Chloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Chloroform	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Chloromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
cis-1,2-Dichloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
cis-1,3-Dichloropropene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Di-isopropyl ether	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Dibromochloromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Dibromomethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Dichlorodifluoromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Ethyl Acetate	ND	10	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Ethyl Ether	ND	10	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Ethyl tert-butyl ether	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Ethylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Freon-113	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Hexachlorobutadiene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Isopropylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
m,p-Xylene	ND	1.0	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Methylene chloride	ND	1.0	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
MTBE	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
n-Butylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
n-Propylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Naphthalene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
o-Xylene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
sec-Butylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	



Certificate of Analysis

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Client Sample ID E-120A-GW_Deep Lab ID: 1203138-01

Volatile Organic Compounds by EPA 8260

Analyst: RP

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Styrene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
tert-Amyl methyl ether	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
tert-Butanol	ND	10	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
tert-Butylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Tetrachloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Toluene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
trans-1,2-Dichloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
trans-1,3-Dichloropropene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Trichloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Trichlorofluoromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Vinyl acetate	ND	10	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
Vinyl chloride	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 17:40	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>107 %</i>		<i>70 - 130</i>		B2I0091	09/07/2012	09/07/12 17:40	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>98.2 %</i>		<i>70 - 130</i>		B2I0091	09/07/2012	09/07/12 17:40	
<i>Surrogate: Dibromofluoromethane</i>	<i>108 %</i>		<i>70 - 130</i>		B2I0091	09/07/2012	09/07/12 17:40	
<i>Surrogate: Toluene-d8</i>	<i>105 %</i>		<i>70 - 130</i>		B2I0091	09/07/2012	09/07/12 17:40	

Semivolatile Organic Compounds by EPA 8270C

Analyst: BB

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,2,4-Trichlorobenzene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
1,2-Dichlorobenzene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
1,3-Dichlorobenzene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
1,4-Dichlorobenzene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
2,4,5-Trichlorophenol	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
2,4,6-Trichlorophenol	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
2,4-Dichlorophenol	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
2,4-Dimethylphenol	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
2,4-Dinitrophenol	ND	50	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
2,4-Dinitrotoluene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
2,6-Dinitrotoluene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
2-Chloronaphthalene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
2-Chlorophenol	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
2-Methylnaphthalene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
2-Methylphenol	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
2-Nitroaniline	ND	50	NA	1	B2I0232	09/12/2012	09/12/12 16:17	



Certificate of Analysis

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Client Sample ID E-120A-GW_Deep Lab ID: 1203138-01

Semivolatile Organic Compounds by EPA 8270C

Analyst: BB

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
2-Nitrophenol	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
3,3'-Dichlorobenzidine	ND	20	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
3-Nitroaniline	ND	50	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
4,6-Dinitro-2-methyphenol	ND	50	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
4-Bromophenyl-phenylether	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
4-Chloro-3-methylphenol	ND	50	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
4-Chloroaniline	ND	20	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
4-Chlorophenyl-phenylether	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
4-Methylphenol	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
4-Nitroaniline	ND	20	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
4-Nitrophenol	ND	50	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Acenaphthene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Acenaphthylene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Anthracene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Benzidine (M)	ND	50	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Benzo(a)anthracene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Benzo(a)pyrene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Benzo(b)fluoranthene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Benzo(g,h,i)perylene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Benzo(k)fluoranthene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Benzoic acid	ND	50	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Benzyl alcohol	ND	20	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
bis(2-chloroethoxy)methane	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
bis(2-Chloroethyl)ether	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
bis(2-chloroisopropyl)ether	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
bis(2-ethylhexyl)phthalate	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Butylbenzylphthalate	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Chrysene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Di-n-butylphthalate	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Di-n-octylphthalate	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Dibenz(a,h)anthracene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Dibenzofuran	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Diethyl phthalate	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Dimethyl phthalate	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Fluoranthene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Fluorene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Hexachlorobenzene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	



Certificate of Analysis

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Project Number : Westside Extension, 4953111421

Report To : Jay Neuhaus
Reported : 09/17/2012

Client Sample ID E-120A-GW_Deep

Lab ID: 1203138-01

Semivolatile Organic Compounds by EPA 8270C

Analyst: BB

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Hexachlorobutadiene	ND	20	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Hexachlorocyclopentadiene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Hexachloroethane	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Indeno(1,2,3-cd)pyrene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Isophorone	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
N-Nitroso-di-n propylamine	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
N-Nitrosodiphenylamine	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Naphthalene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Nitrobenzene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Pentachlorophenol	ND	50	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Phenanthrene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Phenol	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Pyrene	ND	10	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
Pyridine	ND	50	NA	1	B2I0232	09/12/2012	09/12/12 16:17	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	82.8 %		37 - 93		B2I0232	09/12/2012	09/12/12 16:17	
<i>Surrogate: 2,4,6-Tribromophenol</i>	120 %		46 - 125		B2I0232	09/12/2012	09/12/12 16:17	
<i>Surrogate: 2-Chlorophenol-d4</i>	70.7 %		36 - 83		B2I0232	09/12/2012	09/12/12 16:17	
<i>Surrogate: 2-Fluorobiphenyl</i>	90.6 %		51 - 100		B2I0232	09/12/2012	09/12/12 16:17	
<i>Surrogate: 2-Fluorophenol</i>	42.2 %		17 - 56		B2I0232	09/12/2012	09/12/12 16:17	
<i>Surrogate: 4-Terphenyl-d14</i>	100 %		58 - 113		B2I0232	09/12/2012	09/12/12 16:17	
<i>Surrogate: Nitrobenzene-d5</i>	81.0 %		39 - 95		B2I0232	09/12/2012	09/12/12 16:17	
<i>Surrogate: Phenol-d5</i>	29.7 %		13 - 45		B2I0232	09/12/2012	09/12/12 16:17	

1,4-Dioxane by EPA 8270/SIM: Isotope Dilution Technique

Analyst: BB

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,4-Dioxane	ND	0.20	0.13	1	B2I0203	09/11/2012	09/11/12 20:57	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	84.6 %		36 - 107		B2I0203	09/11/2012	09/11/12 20:57	
<i>Surrogate: 2-Fluorobiphenyl</i>	108 %		42 - 120		B2I0203	09/11/2012	09/11/12 20:57	
<i>Surrogate: 4-Terphenyl-d14</i>	87.8 %		67 - 142		B2I0203	09/11/2012	09/11/12 20:57	
<i>Surrogate: Nitrobenzene-d5</i>	50.8 %		36 - 130		B2I0203	09/11/2012	09/11/12 20:57	



Certificate of Analysis

AMEC
6001 Rickenbacker Road
Los Angeles , CA 90040-3031

Project Number : Westside Extension, 4953111421
Report To : Jay Neuhaus
Reported : 09/17/2012

Client Sample ID E-120A-GW_Deep Lab ID: 1203138-01

pH by EPA 9040B

Analyst: CB

Analyte	Result (pH Units)	PQL (pH Units)	MDL (pH Units)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
pH	7.2	0.10	NA	1	B2I0087	09/06/2012	09/06/12 17:16	



Certificate of Analysis

AMEC 6001 Rickenbacker Road Los Angeles , CA 90040-3031	Project Number : Westside Extension, 4953111421 Report To : Jay Neuhaus Reported : 09/17/2012
---	---

Notes and Definitions

- S2 Surrogate recovery was below laboratory acceptance limit. Reextraction and/or reanalysis confirms low recovery caused by matrix effects.
- R RPD value outside acceptance criteria. Calculation is based on raw values.
- M3 Matrix spike recovery outside of acceptance limit due to disproportionate concentration of the analyte to spike level. The analytical batch was validated by the laboratory control sample.
- M2 Matrix spike recovery outside of acceptance limit due to possible matrix interference. The analytical batch was validated by the laboratory control sample.
- M1 Matrix spike recovery outside of acceptance limit. The analytical batch was validated by the laboratory control sample.
- ND Analyte not detected at or above reporting limit
- PQL Practical Quantitation Limit
- MDL Method Detection Limit
- NR Not Reported
- RPD Relative Percent Difference
- CA1 CA-NELAP (CDPH)
- CA2 CA-ELAP (CDPH)
- OR1 OR-NELAP (OSPHL)
- TX1 TX-NELAP (TCEQ)



AMERICAN SCIENTIFIC LABORATORIES, LLC

Environmental Testing Services

2520 N. San Fernando Rd., Los Angeles, CA 90065 Tel: (323) 223-9700 Fax: (323) 223-9500

Ordered By

Advanced Technology Laboratories
3275 Walnut Ave.
Signal Hill, CA 90755-5225

Number of Pages 3

Date Received 09/07/2012

Date Reported 09/14/2012

Telephone (562) 989-4045
Attn Rachelle Arada

Job Number	Ordered	Client
54675	09/07/2012	ATL

Project ID: 1203138

Project Name:

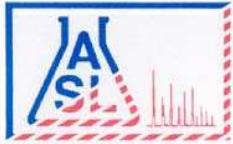
Enclosed are the results of analyses on 3 samples analyzed as specified on attached chain of custody.

A handwritten signature in black ink that appears to read "Wendy Lu".

Wendy Lu
Organics Supervisor

American Scientific Laboratories, LLC (ASL) accepts sample materials from clients for analysis with the assumption that all of the information provided to ASL verbally or in writing by our clients (and/or their agents), regarding samples being submitted to ASL, is complete and accurate. ASL accepts all samples subject to the following conditions:

- 1) ASL is not responsible for verifying any client-provided information regarding any samples submitted to the laboratory.
- 2) ASL is not responsible for any consequences resulting from any inaccuracies, omissions, or misrepresentations contained in client-provided information regarding samples submitted to the laboratory.



AMERICAN SCIENTIFIC LABORATORIES, LLC

Environmental Testing Services

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ANALYTICAL RESULTS

Ordered By

Advanced Technology Laboratories
3275 Walnut Ave.
Signal Hill, CA 90755-5225

Telephone: (562)989-4045

Attn: Rachelle Arada

Page: **2**

Project ID: 1203138

ASL Job Number	Submitted	Client
54675	09/07/2012	ATL

Method: SM5210B, Biochemical Oxygen Demand (BOD)

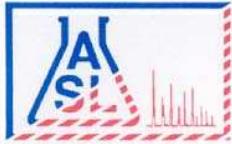
QC Batch No: 091212-1

Our Lab I.D.		288026	288027			
Client Sample I.D.		1203138-01	1203138-02			
Date Sampled		09/06/2012	09/06/2012			
Date Prepared		09/07/2012	09/07/2012			
Preparation Method						
Date Analyzed		09/12/2012	09/12/2012			
Matrix		Groundwater	Groundwater			
Units		mg/L	mg/L			
Dilution Factor		1	1			
Analytes	PQL	Results	Results			
Conventional						
BOD @ 20C	5.00	ND	29.1			

QUALITY CONTROL REPORT

QC Batch No: 091212-1

Analytes	LCS % REC	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit					
Conventional										
BOD @ 20C	97	94	3.2	80-120	20					



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Environmental Testing Services

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ANALYTICAL RESULTS

Ordered By

Advanced Technology Laboratories
3275 Walnut Ave.
Signal Hill, CA 90755-5225

Telephone: (562)989-4045

Attn: Rachelle Arada

Page: 3

Project ID: 1203138

ASL Job Number	Submitted	Client
54675	09/07/2012	ATL

Method: SM5210B, Biochemical Oxygen Demand (BOD)

QC Batch No: 091212-1

Our Lab I.D.		288028					
Client Sample I.D.		1203138-02					
Date Sampled		09/06/2012					
Date Prepared		09/07/2012					
Preparation Method							
Date Analyzed		09/12/2012					
Matrix		Liquid					
Units		mg/L					
Dilution Factor		1					
Analytes	PQL	Results					
Conventional							
BOD @ 20C	5.00	ND					

QUALITY CONTROL REPORT

QC Batch No: 091212-1

Analytes	LCS % REC	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit					
Conventional										
BOD @ 20C	97	94	3.2	80-120	20					


**ADVANCED TECHNOLOGY
LABORATORIES**
SUBCONTRACT ORDER

Work Order: 1203138

ASL JOB # 54675

SENDING LABORATORY:

Advanced Technology Laboratories
 3275 Walnut Avenue
 Signal Hill, CA 90755
 Phone: 562.989.4045
 Fax: 562.989.6348
 Project Manager: Rachelle Arada

RECEIVING LABORATORY:

American Scientific Laboratories
 2520 N. San Fernando Rd.
 Los Angeles, CA 90065
 Phone :(323) 223-9700
 Fax: (323) 223-9500
 PO#: SC07483 - Standard TAT
(RA)

IMPORTANT : Please include Work Order # and PO # in your invoice.

Analysis	Due	Expires	Sampled	Comments	
ATL Lab#: 1203138-01 / E-120A-GW_Deep		Groundwater	09/06/12 11:15		288026
405.1_5210B	09/20/12 17:00	09/08/12 11:15			
ATL Lab#: 1203138-02 / G-109-GW_Deep		Groundwater	09/06/12 13:10		288027
405.1_5210B	09/20/12 17:00	09/08/12 13:10			
ATL Lab#: 1203138-03 / QCEB_9/6/12		Aqueous	09/06/12 13:20		288028
405.1_5210B	09/20/12 17:00	09/08/12 13:20			

 Released By	9/6/12 Date	 Received By	9-7-12 Date
Released By	Date	Received By	Date



American Environmental Testing Laboratory Inc.

2834 & 2908 North Naomi Street Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181
Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com

Ordered By

Advanced Technology Laboratories
3275 Walnut Street
Signal Hill, CA 90755-5225

Number of Pages 2

Date Received 09/07/2012

Date Reported 09/17/2012

Telephone: (562)989-4045
Attention: Rachelle Arada

Job Number	Order Date	Client
66784	09/07/2012	ATL

Project ID: 1203138
Project Name: PO# SC07484

Enclosed please find results of analyses of 3 water samples which were analyzed as specified on the attached chain of custody. If there are any questions, please do not hesitate to call.

Checked By:

Approved By:

Cyrus Razmara, Ph.D.
Laboratory Director



American Environmental Testing Laboratory Inc.

2834 & 2908 North Naomi Street Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181

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Page: 1 A

Ordered By

Advanced Technology Laboratories
3275 Walnut Street
Signal Hill, CA 90755-5225

Project ID: 1203138

Date Received 09/07/2012

Date Reported 09/17/2012

Telephone: (562) 989-4045
Attention: Rachelle Arada

Job Number	Order Date	Client
66784	09/07/2012	ATL

CERTIFICATE OF ANALYSIS CASE NARRATIVE

AETL received 3 samples with the following specification on 09/07/2012.

Lab ID	Sample ID	Sample Date	Matrix	QTY of Containers
66784.01	1203138-01	09/06/2012	Aqueous	1
66784.02	1203138-02	09/06/2012	Aqueous	1
66784.03	1203138-03	09/06/2012	Aqueous	1

The samples were analyzed as specified on the enclosed chain of custody.
No analytical non-conformances were encountered.

Checked By: _____

Approved By: _____

Cyrus Razmara, Ph.D.
Laboratory Director

Page 114 of 122



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ANALYTICAL RESULTS

Ordered By

Advanced Technology Laboratories
3275 Walnut Street
Signal Hill, CA 90755-5225

Telephone: (562)989-4045

Attn: Rachelle Arada

Page: 2

Project ID: 1203138

Project Name: PO# SC07484

AETL Job Number	Submitted	Client
66784	09/07/2012	ATL

Method: 310.1, Alkalinity, Titrimetric (pH 4.5), (EPA/600/4-79-020)

QC Batch No: 091212-1

Our Lab I.D.		Method Blank	66784.01	66784.02	66784.03	
Client Sample I.D.			1203138-01	1203138-02	1203138-03	
Date Sampled			09/06/2012	09/06/2012	09/06/2012	
Date Prepared		09/12/2012	09/12/2012	09/12/2012	09/12/2012	
Preparation Method		310.1	310.1	310.1	310.1	
Date Analyzed		09/12/2012	09/12/2012	09/12/2012	09/12/2012	
Matrix		Aqueous	Aqueous	Aqueous	Aqueous	
Units		mg/L	mg/L	mg/L	mg/L	
Dilution Factor		1	1	1	1	
Analytes	MDL	PQL	Results	Results	Results	Results
Alkalinity, Bicarbonate	2.0	2.0	ND	580	500	ND
Alkalinity, Carbonate	2.0	2.0	ND	ND	ND	ND
Alkalinity, Hydroxide	2.0	2.0	ND	ND	ND	ND
Alkalinity, Total	2.0	2.0	ND	580	500	ND

QUALITY CONTROL REPORT

QC Batch No: 091212-1; Dup or Spiked Sample: 66762.01; LCS: Clean Water; QC Prepared: 09/12/2012; QC Analyzed: 09/12/2012;
Units: mg/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Alkalinity, Bicarbonate	540	20.0	560	100	20.0	560	100	<1	80-120	<15
Alkalinity, Total	540	20.0	560	100	20.0	560	100	<1	80-120	<15

QC Batch No: 091212-1; Dup or Spiked Sample: 66762.01; LCS: Clean Water; QC Prepared: 09/12/2012; QC Analyzed: 09/12/2012;
Units: mg/L

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
Alkalinity, Bicarbonate	540	550	1.8	<15	20.0	20.0	100	80-120		
Alkalinity, Total	540	550	1.8	<15	20.0	20.0	100	80-120		



American Environmental Testing Laboratory Inc.

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Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com

Data Qualifiers and Descriptors

Data Qualifier:

- #: Recovery is not within acceptable control limits.
- *: In the QC section, sample results have been taken directly from the ICP reading. No preparation factor has been applied.
- B: Analyte was present in the Method Blank.
- D: Result is from a diluted analysis.
- E: Result is beyond calibration limits and is estimated.
- H: Analysis was performed over the allowed holding time due to circumstances which were beyond laboratory control.
- J: Analyte was detected . However, the analyte concentration is an estimated value, which is between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL).
- M: Matrix spike recovery is outside control limits due to matrix interference. Laboratory Control Sample recovery was acceptable.
- MCL: Maximum Contaminant Level
- NS: No Standard Available
- S6: Surrogate recovery is outside control limits due to matrix interference.
- S8: The analysis of the sample required a dilution such that the surrogate concentration was diluted below the method acceptance criteria.
- X: Results represent LCS and LCSD data.

Definition:

- %Limi: Percent acceptable limits.
- %REC: Percent recovery.
- Con.L: Acceptable Control Limits
- Conce: Added concentration to the sample.
- LCS: Laboratory Control Sample
- MDL: Method Detection Limit is a statistically derived number which is specific for each instrument; each method, and each compound. It indicates a distinctively detectable quantity with 99% probability.



American Environmental Testing Laboratory Inc.

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Data Qualifiers and Descriptors

MS: Matrix Spike

MS DU: Matrix Spike Duplicate

ND: Analyte was not detected in the sample at or above MDL.

PQL: Practical Quantitation Limit or ML (Minimum Level as per RWQCB) is the minimum concentration that can be quantified with more than 99% confidence. Taking into account all aspects of the entire analytical instrumentation and practice.

Recov: Recovered concentration in the sample.

RPD: Relative Percent Difference

**ADVANCED TECHNOLOGY
LABORATORIES**

SUBCONTRACT ORDER

Job# 66784

Work Order: 1203138

SENDING LABORATORY:

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Phone: 562.989.4045
Fax: 562.989.6348
Project Manager: Rachelle Arada

RECEIVING LABORATORY:

AETL
2834 North Naomi Street
Burbank, CA 91504
Phone :(818) 845-8200
Fax: (818) 845-8840
PO#: SC07484 - STandard TAT *(P)*

IMPORTANT : Please include Work Order # and PO # in your invoice.

Analysis	Due	Expires	Sampled	Comments
ATL Lab#: 1203138-01 / E-120A-GW_Deep		Groundwater	09/06/12 11:15	<i>66784-01</i>
310.1_2320B_Total_SUB	09/13/12 17:00	09/20/12 11:15		Report Carbonate
ATL Lab#: 1203138-02 / G-109-GW_Deep		Groundwater	09/06/12 13:10	<i>66784-02</i>
310.1_2320B_Total_SUB	09/13/12 17:00	09/20/12 13:10		
ATL Lab#: 1203138-03 / QCEB_9/6/12		Aqueous	09/06/12 13:20	<i>66784-03</i>
310.1_2320B_Total_SUB	09/13/12 17:00	09/20/12 13:20		

<i>[Signature]</i>	<i>9/6/12</i>	<i>[Signature]</i>	<i>9/6/12</i>	<i>1020</i>
Released By	Date	Received By	Date	
<i>[Signature]</i>	<i>9/6/12</i>	<i>[Signature]</i>	<i>09/07/12</i>	<i>14.00</i>
Released By	Date	Received By	Date	

CHAIN OF CUSTODY RECORD

FOR LABORATORY USE ONLY:																																											
Client: <u>AMTEC</u> Attn: <u>Jay Neukens</u>		P.O.#: _____	Quote #: _____	Method of Transport <input checked="" type="checkbox"/> ATL <input type="checkbox"/> Client <input type="checkbox"/> FedEx <input type="checkbox"/> GSO <input type="checkbox"/> Other: _____	Sample Condition Upon Receipt Y <input type="checkbox"/> N <input type="checkbox"/> 4. SEALED Y <input type="checkbox"/> N <input type="checkbox"/> 1. CHILLED Y <input type="checkbox"/> N <input type="checkbox"/> 2. HEADSPACE (VOA) Y <input type="checkbox"/> N <input type="checkbox"/> 5. # OF SPLS/MATCH COC Y <input type="checkbox"/> N <input type="checkbox"/> 3. CONTAINER INTACT Y <input type="checkbox"/> N <input type="checkbox"/> 6. PRESERVED																																						
Project Name: <u>Westside Extens. On Relinquished by: (Signature and Printed Name)</u>		Project #: <u>945311421</u>	Sampler: <u>Paul Kac</u>	Date: <u>9/6/12</u>	Date: <u>9/6/12</u> Time: <u>16:05</u>																																						
Relinquished by: (Signature and Printed Name)		Date: <u>9/6/12</u>	Received by: (Signature and Printed Name)	Date: <u>9/6/12</u>	Date: <u>9/6/12</u> Time: <u>16:05</u>																																						
Relinquished by: (Signature and Printed Name)		Date: <u>9/6/12</u>	Received by: (Signature and Printed Name)	Date: <u>9/6/12</u>	Date: <u>9/6/12</u> Time: <u>16:05</u>																																						
Relinquished by: (Signature and Printed Name)		Date: <u>9/6/12</u>	Received by: (Signature and Printed Name)	Date: <u>9/6/12</u>	Date: <u>9/6/12</u> Time: <u>16:05</u>																																						
I hereby authorize ATL to perform the work indicated below:		Send Report To:	Bill To:	Special Instructions/Comments:																																							
Project Mgr /Submitter: Print Name _____ Date _____ Signature _____		Attn: _____ Co: _____ Addr: _____ City: _____ State: _____ Zip: _____	Attn: _____ Co: _____ Addr: _____ City: _____ State: _____ Zip: _____																																								
<p>Sample/Records - Archival & Disposal Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.</p> <p>Storage Fees (applies when storage is requested): • Sample : \$2.00 / sample / mo. (after 45 days) • Records : \$1.00 / ATL workorder / mo (after 1 year)</p>																																											
<table border="1"> <thead> <tr> <th colspan="2">LAB USE ONLY:</th> <th colspan="4">Sample Description</th> </tr> <tr> <th>E</th> <th>M</th> <th>Lab No.</th> <th>Sample I.D./Location</th> <th>Date</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20338-61</td> <td>2-120A-GN-Drip</td> <td>9/6/12</td> <td>13:00</td> <td>X</td> </tr> <tr> <td>2</td> <td>2-129-GN-Drip</td> <td>9/6/12</td> <td>13:00</td> <td>X</td> </tr> <tr> <td>3</td> <td>Q-CB-9612</td> <td>9/6/12</td> <td>13:00</td> <td>X</td> </tr> <tr> <td>4</td> <td>5-109-GN-Shallow</td> <td>9/6/12</td> <td>13:30</td> <td>X</td> </tr> <tr> <td>5</td> <td>QCTB-9612</td> <td>9/6/12</td> <td>13:30</td> <td>X</td> </tr> </tbody> </table>						LAB USE ONLY:		Sample Description				E	M	Lab No.	Sample I.D./Location	Date	Time	1	20338-61	2-120A-GN-Drip	9/6/12	13:00	X	2	2-129-GN-Drip	9/6/12	13:00	X	3	Q-CB-9612	9/6/12	13:00	X	4	5-109-GN-Shallow	9/6/12	13:30	X	5	QCTB-9612	9/6/12	13:30	X
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2	2-129-GN-Drip	9/6/12	13:00	X																																							
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Critical	B=Next workday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																						
Preservatives: H=HCl N=HNO ₃ S=H ₂ SO ₄ C=4°C Zn(Ac) ₂ O=NaOH T=Na ₂ SO ₃																																											
<p>• TAT starts 8 a.m. following day if samples received after 5 p.m.</p> <p>Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedar G=Glass M=Metal P=Plastic Routine = 7 Workdays</p>																																											

TAT starts 8 a.m. following day if samples received after 5 p.m.

Rev 2010-0325

Figure F-1.66

**PHASE III ENVIRONMENTAL INVESTIGATION WORK PLAN
WELL DEVELOPMENT AND SAMPLING**

Groundwater Sample Analysis Contract List

Analytes	Method
dissolved methane	RSKSOP-175
Total sulfide and dissolved hydrogen sulfide	SM-4500-S=D
sulfate, chloride, nitrate	EPA 300.0
total dissolved solids	SM 2540C
total suspended solids	SM 2540D
pH	EPA 9040
TLC dissolved metals Total metals	EPA 6010B/7000 series
mercury, dissolved	EPA 7470A by cold vapor
TRPH	EPA 1664 SGT/HEM
TPH - DRO & ORO	EPA 8015M/3520C
TPH - gasoline	EPA 8015M/5030B
SVOCs by GC/MS	EPA 8270C/3520C
VOCs by GC/MS including BTEX	EPA 8260B/3050B
oil & grease	EPA 1664
alkalinity	SM 2320B
pesticides	EPA 8081
PCBs	EPA 8082
Trip blanks	EPA 8260



September 14, 2012



Jay Neuhaus
AMEC
6001 Rickenbacker Road
Los Angeles, CA 90040-3031
Tel: (323) 889-5300
Fax:(323) 721-6700

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196
ORELAP No.: CA300003
TCEQ No.: T104704502

Re: ATL Work Order Number : 1203111

Client Reference : Westside Extension, 4953111421

Enclosed are the results for sample(s) received on September 04, 2012 by Advanced Technology Laboratories. The sample(s) are tested for the parameters as indicated on the enclosed chain of custody in accordance with applicable laboratory certifications. The laboratory results contained in this report specifically pertains to the sample(s) submitted.

Thank you for the opportunity to serve the needs of your company. If you have any questions, please feel free to contact me or your Project Manager.

Sincerely,

A handwritten signature in black ink, appearing to read 'Eddie Rodriguez'.

Eddie Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and its absence renders the report invalid. Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or applicable state-specific certification programs. The report cannot be reproduced without written permission from the client and Advanced Technology Laboratories.

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Los Angeles , CA 90040-3031

Project Number : Westside Extension, 4953111421
Report To : Jay Neuhaus
Reported : 09/14/2012

SUMMARY OF SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
E-121A-GW	1203111-01	Water	9/04/12 11:00	9/04/12 13:42
QCTB_9/4/12	1203111-02	Water	9/04/12 0:00	9/04/12 13:42
E-121A-Air	1203111-03	Air	9/04/12 11:20	9/04/12 13:42

CASE NARRATIVE

The sample for SM5210 (BOD) was subcontracted to American Scientific Laboratories with ELAP Cert.# 2200.

The sample for EPA 1516 analysis was subcontracted to Air Technology Lab.

The sample for SM 2320B (Alkalinity, Carbonate) analysis was subcontracted to AETL with DOHS Cert.#1541.

Sample Receiving/General Comments

Headspace >5-6mm was noted on sample QCTB_9/14/12. The trip blank was prepared at the lab without headspace. The headspace maybe caused by degassing due to temperature swing.



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Client Sample ID E-121A-GW

Lab ID: 1203111-01

Anions Scan by Ion Chromatography EPA 300.0

Analyst: AG

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Chloride	100	5.0	NA	10	B2I0040	09/05/2012	09/05/12 11:41	
Nitrate as N	0.59	0.10	NA	1	B2I0040	09/05/2012	09/05/12 09:16	
Nitrite, as N	ND	0.10	NA	1	B2I0040	09/05/2012	09/05/12 09:16	
Sulfate	180	10	NA	10	B2I0040	09/05/2012	09/05/12 11:41	

Perchlorate by IC EPA 314.0

Analyst: AG

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Perchlorate	ND	2.0	NA	1	B2I0198	09/11/2012	09/11/12 09:32	

Oil & Grease, Hexane Extractable Material (HEM) EPA 1664A

Analyst: LA

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Oil & Grease, HEM	3.3	2.2	NA	1	B2I0215	09/11/2012	09/11/12 00:00	

Total Petroleum Hydrocarbons, HEM/SGT EPA 1664A

Analyst: LA

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Total Petroleum Hydrocarbons	ND	2.2	NA	1	B2I0222	09/11/2012	09/11/12 00:00	

Dissolved Gases in Water

Analyst: BB

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Methane	1.7	1.0	NA	1	B2I0139	09/10/2012	09/10/12 10:24	

Hardness by Calculation by SM 2340B

Analyst: KT/SB

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Hardness Total (As CaCO3)	760	2.0	NA	1	B2I0202	09/11/2012	09/12/12 14:20	



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Lab ID: 1203111-01

Total Dissolved Solids (Residue, Filterable) by SM 2540C

Analyst: AG

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Residue, Dissolved	1100	33	NA	1	B2I0206	09/10/2012	09/10/12 11:30	

Total Suspended Solids (Residue, Non-Filtrable) by SM 2540D

Analyst: AG

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Residue, Suspended	4600	33	NA	1	B2I0199	09/10/2012	09/10/12 11:00	

Residue, Settleable by SM 2540F

Analyst: AG

Analyte	Result (mL/L)	PQL (mL/L)	MDL (mL/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Residue, Settleable	14	0.10	NA	1	B2I0113	09/05/2012	09/05/12 16:56	

Sulfide, Total by SM 4500-S=D

Analyst: LA

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Sulfide, Total	0.58	0.25	NA	25	B2I0155	09/10/2012	09/10/12 11:59	D1

Sulfide, Dissolved by SM 4500-S=D

Analyst: LA

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Hydrogen sulfide	ND	0.01	NA	1	B2I0110	09/07/2012	09/07/12 11:57	

Total Metals by ICP-AES EPA 6010B

Analyst: KK

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Boron	1.6	0.10	NA	1	B2I0102	09/07/2012	09/07/12 16:34	

Title 22 Metals by ICP-AES EPA 6010B

Analyst: KT/SB

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Antimony	ND	0.005	NA	1	B2I0202	09/11/2012	09/12/12 14:20	



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Client Sample ID E-121A-GW

Lab ID: 1203111-01

Title 22 Metals by ICP-AES EPA 6010B

Analyst: KT/SB

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Arsenic	0.01	0.01	NA	1	B2I0202	09/11/2012	09/12/12 14:20	
Barium	0.38	0.003	NA	1	B2I0202	09/11/2012	09/12/12 14:20	
Beryllium	ND	0.003	NA	1	B2I0202	09/11/2012	09/12/12 14:20	
Cadmium	ND	0.003	NA	1	B2I0202	09/11/2012	09/12/12 14:20	
Chromium	0.12	0.003	NA	1	B2I0202	09/11/2012	09/12/12 14:20	
Cobalt	0.04	0.003	NA	1	B2I0202	09/11/2012	09/12/12 14:20	
Copper	0.08	0.005	NA	1	B2I0202	09/11/2012	09/12/12 14:20	
Lead	0.008	0.005	NA	1	B2I0202	09/11/2012	09/12/12 14:20	
Molybdenum	0.03	0.005	NA	1	B2I0202	09/11/2012	09/12/12 14:20	
Nickel	0.07	0.005	NA	1	B2I0202	09/11/2012	09/12/12 14:20	
Selenium	ND	0.01	NA	1	B2I0202	09/11/2012	09/12/12 14:20	
Silver	ND	0.003	NA	1	B2I0202	09/11/2012	09/12/12 14:20	
Thallium	ND	0.02	NA	1	B2I0202	09/11/2012	09/12/12 14:20	
Vanadium	0.22	0.003	NA	1	B2I0202	09/11/2012	09/12/12 14:20	
Zinc	0.19	0.01	NA	1	B2I0202	09/11/2012	09/12/12 14:20	

Mercury by AA (Cold Vapor) EPA 7470

Analyst: VV

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Mercury	ND	0.20	NA	1	B2I0064	09/06/2012	09/06/12 16:12	

Gasoline Range Organics by EPA 8015B

Analyst: LT

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Gasoline Range Organics	ND	0.05	NA	1	B2I0054	09/06/2012	09/06/12 17:11	
Surrogate: 4-Bromofluorobenzene	88.8 %		70 - 130		B2I0054	09/06/2012	09/06/12 17:11	

Diesel Range Organics by EPA 8015B

Analyst: CR

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
DRO	ND	0.05	NA	1	B2I0057	09/06/2012	09/06/12 16:49	
ORO	ND	0.05	NA	1	B2I0057	09/06/2012	09/06/12 16:49	
Surrogate: p-Terphenyl	96.9 %		48 - 124		B2I0057	09/06/2012	09/06/12 16:49	



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Client Sample ID E-121A-GW

Lab ID: 1203111-01

Organochlorine Pesticides by EPA 8081

Analyst: PT

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
4,4'-DDD	ND	0.05	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
4,4'-DDE	ND	0.05	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
4,4'-DDT	ND	0.05	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
Aldrin	ND	0.02	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
alpha-BHC	ND	0.02	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
alpha-Chlordane	ND	0.02	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
beta-BHC	ND	0.02	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
Chlordane	ND	0.25	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
delta-BHC	ND	0.02	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
Dieldrin	ND	0.05	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
Endosulfan I	ND	0.02	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
Endosulfan II	ND	0.05	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
Endosulfan sulfate	ND	0.05	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
Endrin	ND	0.05	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
Endrin aldehyde	ND	0.05	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
Endrin ketone	ND	0.05	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
gamma-BHC	ND	0.02	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
gamma-Chlordane	ND	0.02	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
Heptachlor	ND	0.02	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
Heptachlor epoxide	ND	0.02	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
Methoxychlor	ND	0.25	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
Toxaphene	ND	2.5	NA	1	B2I0121	09/06/2012	09/10/12 17:50	
<i>Surrogate: Decachlorobiphenyl</i>	75.0 %		23 - 121		B2I0121	09/06/2012	09/10/12 17:50	
<i>Surrogate: Tetrachloro-m-xylene</i>	93.7 %		55 - 109		B2I0121	09/06/2012	09/10/12 17:50	



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Client Sample ID E-121A-GW

Lab ID: 1203111-01

Polychlorinated Biphenyls by EPA 8082

Analyst: PT

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Aroclor 1016	ND	0.50	NA	1	B2I0121	09/06/2012	09/10/12 18:36	
Aroclor 1221	ND	1.0	NA	1	B2I0121	09/06/2012	09/10/12 18:36	
Aroclor 1232	ND	0.50	NA	1	B2I0121	09/06/2012	09/10/12 18:36	
Aroclor 1242	ND	0.50	NA	1	B2I0121	09/06/2012	09/10/12 18:36	
Aroclor 1248	ND	0.50	NA	1	B2I0121	09/06/2012	09/10/12 18:36	
Aroclor 1254	ND	0.50	NA	1	B2I0121	09/06/2012	09/10/12 18:36	
Aroclor 1260	ND	0.50	NA	1	B2I0121	09/06/2012	09/10/12 18:36	
Aroclor 1262	ND	0.50	NA	1	B2I0121	09/06/2012	09/10/12 18:36	
Aroclor 1268	ND	0.50	NA	1	B2I0121	09/06/2012	09/10/12 18:36	
<i>Surrogate: Decachlorobiphenyl</i>	97.5 %		41 - 106		B2I0121	09/06/2012	09/10/12 18:36	
<i>Surrogate: Tetrachloro-m-xylene</i>	86.1 %		48 - 108		B2I0121	09/06/2012	09/10/12 18:36	

Volatile Organic Compounds by EPA 8260

Analyst: RP

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,1,1,2-Tetrachloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,1,1-Trichloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,1,2,2-Tetrachloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,1,2-Trichloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,1-Dichloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,1-Dichloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,1-Dichloropropene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,2,3-Trichloropropane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,2,3-Trichlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,2,4-Trichlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,2,4-Trimethylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,2-Dibromo-3-chloropropane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,2-Dibromoethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,2-Dichlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,2-Dichloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,2-Dichloropropane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,3,5-Trimethylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,3-Dichlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,3-Dichloropropane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
1,4-Dichlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
2,2-Dichloropropane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	



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Reported : 09/14/2012

Client Sample ID E-121A-GW

Lab ID: 1203111-01

Volatile Organic Compounds by EPA 8260

Analyst: RP

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
2-Chloroethyl vinyl ether	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
2-Chlorotoluene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
4-Chlorotoluene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
4-Isopropyltoluene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Benzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Bromobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Bromochloromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Bromodichloromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Bromoform	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Bromomethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Carbon disulfide	ND	1.0	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Carbon tetrachloride	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Chlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Chloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Chloroform	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Chloromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
cis-1,2-Dichloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
cis-1,3-Dichloropropene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Di-isopropyl ether	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Dibromochloromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Dibromomethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Dichlorodifluoromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Ethyl Acetate	ND	10	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Ethyl Ether	ND	10	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Ethyl tert-butyl ether	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Ethylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Freon-113	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Hexachlorobutadiene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Isopropylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
m,p-Xylene	ND	1.0	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Methylene chloride	ND	1.0	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
MTBE	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
n-Butylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
n-Propylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Naphthalene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
o-Xylene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
sec-Butylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	



Certificate of Analysis

AMEC
6001 Rickenbacker Road
Los Angeles , CA 90040-3031

Project Number : Westside Extension, 4953111421
Report To : Jay Neuhaus
Reported : 09/14/2012

Client Sample ID E-121A-GW

Lab ID: 1203111-01

Volatile Organic Compounds by EPA 8260

Analyst: RP

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Styrene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
tert-Amyl methyl ether	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
tert-Butanol	ND	10	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
tert-Butylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Tetrachloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Toluene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
trans-1,2-Dichloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
trans-1,3-Dichloropropene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Trichloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Trichlorofluoromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Vinyl acetate	ND	10	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
Vinyl chloride	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 13:23	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>112 %</i>		<i>70 - 130</i>		B2I0091	09/07/2012	09/07/12 13:23	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>97.7 %</i>		<i>70 - 130</i>		B2I0091	09/07/2012	09/07/12 13:23	
<i>Surrogate: Dibromofluoromethane</i>	<i>110 %</i>		<i>70 - 130</i>		B2I0091	09/07/2012	09/07/12 13:23	
<i>Surrogate: Toluene-d8</i>	<i>104 %</i>		<i>70 - 130</i>		B2I0091	09/07/2012	09/07/12 13:23	

Semivolatile Organic Compounds by EPA 8270C

Analyst: BB

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,2,4-Trichlorobenzene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
1,2-Dichlorobenzene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
1,3-Dichlorobenzene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
1,4-Dichlorobenzene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
2,4,5-Trichlorophenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
2,4,6-Trichlorophenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
2,4-Dichlorophenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
2,4-Dimethylphenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
2,4-Dinitrophenol	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
2,4-Dinitrotoluene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
2,6-Dinitrotoluene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
2-Chloronaphthalene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
2-Chlorophenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
2-Methylnaphthalene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
2-Methylphenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
2-Nitroaniline	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 16:48	



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Client Sample ID E-121A-GW

Lab ID: 1203111-01

Semivolatile Organic Compounds by EPA 8270C

Analyst: BB

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
2-Nitrophenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
3,3'-Dichlorobenzidine	ND	20	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
3-Nitroaniline	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
4,6-Dinitro-2-methyphenol	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
4-Bromophenyl-phenylether	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
4-Chloro-3-methylphenol	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
4-Chloroaniline	ND	20	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
4-Chlorophenyl-phenylether	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
4-Methylphenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
4-Nitroaniline	ND	20	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
4-Nitrophenol	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Acenaphthene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Acenaphthylene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Anthracene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Benzidine (M)	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Benzo(a)anthracene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Benzo(a)pyrene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Benzo(b)fluoranthene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Benzo(g,h,i)perylene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Benzo(k)fluoranthene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Benzoic acid	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Benzyl alcohol	ND	20	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
bis(2-chloroethoxy)methane	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
bis(2-Chloroethyl)ether	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
bis(2-chloroisopropyl)ether	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
bis(2-ethylhexyl)phthalate	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Butylbenzylphthalate	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Chrysene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Di-n-butylphthalate	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Di-n-octylphthalate	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Dibenz(a,h)anthracene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Dibenzofuran	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Diethyl phthalate	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Dimethyl phthalate	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Fluoranthene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Fluorene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Hexachlorobenzene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	



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Report To : Jay Neuhaus

Reported : 09/14/2012

Client Sample ID E-121A-GW

Lab ID: 1203111-01

Semivolatile Organic Compounds by EPA 8270C

Analyst: BB

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Hexachlorobutadiene	ND	20	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Hexachlorocyclopentadiene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Hexachloroethane	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Indeno(1,2,3-cd)pyrene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Isophorone	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
N-Nitroso-di-n propylamine	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
N-Nitrosodiphenylamine	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Naphthalene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Nitrobenzene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Pentachlorophenol	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Phenanthrene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Phenol	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Pyrene	ND	10	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
Pyridine	ND	50	NA	1	B2I0044	09/05/2012	09/06/12 16:48	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	65.4 %		37 - 93		B2I0044	09/05/2012	09/06/12 16:48	
<i>Surrogate: 2,4,6-Tribromophenol</i>	94.8 %		46 - 125		B2I0044	09/05/2012	09/06/12 16:48	
<i>Surrogate: 2-Chlorophenol-d4</i>	61.5 %		36 - 83		B2I0044	09/05/2012	09/06/12 16:48	
<i>Surrogate: 2-Fluorobiphenyl</i>	68.9 %		51 - 100		B2I0044	09/05/2012	09/06/12 16:48	
<i>Surrogate: 2-Fluorophenol</i>	40.7 %		17 - 56		B2I0044	09/05/2012	09/06/12 16:48	
<i>Surrogate: 4-Terphenyl-d14</i>	87.5 %		58 - 113		B2I0044	09/05/2012	09/06/12 16:48	
<i>Surrogate: Nitrobenzene-d5</i>	69.7 %		39 - 95		B2I0044	09/05/2012	09/06/12 16:48	
<i>Surrogate: Phenol-d5</i>	33.5 %		13 - 45		B2I0044	09/05/2012	09/06/12 16:48	

1,4-Dioxane by EPA 8270/SIM: Isotope Dilution Technique

Analyst: BB

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,4-Dioxane	ND	0.20	NA	1	B2I0203	09/11/2012	09/11/12 18:03	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	83.1 %		36 - 107		B2I0203	09/11/2012	09/11/12 18:03	
<i>Surrogate: 2-Fluorobiphenyl</i>	99.3 %		42 - 120		B2I0203	09/11/2012	09/11/12 18:03	
<i>Surrogate: 4-Terphenyl-d14</i>	83.2 %		67 - 142		B2I0203	09/11/2012	09/11/12 18:03	
<i>Surrogate: Nitrobenzene-d5</i>	55.3 %		36 - 130		B2I0203	09/11/2012	09/11/12 18:03	



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Lab ID: 1203111-01

pH by EPA 9040B

Analyst: CB

Analyte	Result (pH Units)	PQL (pH Units)	MDL (pH Units)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
pH	7.2	0.10	NA	1	B2I0028	09/04/2012	09/04/12 17:59	



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Reported : 09/14/2012

Client Sample ID QCTB_9/4/12

Lab ID: 1203111-02

Volatile Organic Compounds by EPA 8260

Analyst: RP

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,1,1,2-Tetrachloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,1,1-Trichloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,1,2,2-Tetrachloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,1,2-Trichloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,1-Dichloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,1-Dichloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,1-Dichloropropene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,2,3-Trichloropropane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,2,3-Trichlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,2,4-Trichlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,2,4-Trimethylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,2-Dibromo-3-chloropropane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,2-Dibromoethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,2-Dichlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,2-Dichloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,2-Dichloropropane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,3,5-Trimethylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,3-Dichlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,3-Dichloropropane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
1,4-Dichlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
2,2-Dichloropropane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
2-Chloroethyl vinyl ether	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
2-Chlorotoluene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
4-Chlorotoluene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
4-Isopropyltoluene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Benzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Bromobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Bromochloromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Bromodichloromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Bromoform	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Bromomethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Carbon disulfide	ND	1.0	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Carbon tetrachloride	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Chlorobenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Chloroethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Chloroform	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Chloromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	



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Client Sample ID QCTB_9/4/12

Lab ID: 1203111-02

Volatile Organic Compounds by EPA 8260

Analyst: RP

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
cis-1,2-Dichloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
cis-1,3-Dichloropropene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Di-isopropyl ether	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Dibromochloromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Dibromomethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Dichlorodifluoromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Ethyl Acetate	ND	10	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Ethyl Ether	ND	10	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Ethyl tert-butyl ether	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Ethylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Freon-113	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Hexachlorobutadiene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Isopropylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
m,p-Xylene	ND	1.0	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Methylene chloride	ND	1.0	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
MTBE	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
n-Butylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
n-Propylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Naphthalene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
o-Xylene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
sec-Butylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Styrene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
tert-Amyl methyl ether	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
tert-Butanol	ND	10	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
tert-Butylbenzene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Tetrachloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Toluene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
trans-1,2-Dichloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
trans-1,3-Dichloropropene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Trichloroethene	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Trichlorofluoromethane	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Vinyl acetate	ND	10	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
Vinyl chloride	ND	0.50	NA	1	B2I0091	09/07/2012	09/07/12 11:18	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	106 %		70 - 130		B2I0091	09/07/2012	09/07/12 11:18	
<i>Surrogate: 4-Bromofluorobenzene</i>	96.7 %		70 - 130		B2I0091	09/07/2012	09/07/12 11:18	
<i>Surrogate: Dibromofluoromethane</i>	105 %		70 - 130		B2I0091	09/07/2012	09/07/12 11:18	
<i>Surrogate: Toluene-d8</i>	104 %		70 - 130		B2I0091	09/07/2012	09/07/12 11:18	



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Client Sample ID E-121A-Air

Lab ID: 1203111-03

Gases by GC (ASTM D1946)

Analyst: MFR

Analyte	Result (ppmv)	PQL (ppmv)	MDL (ppmv)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Methane	21000	100	NA	10	B2I0053	09/06/2012	09/06/12 09:56	



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QUALITY CONTROL SECTION

Anions Scan by Ion Chromatography EPA 300.0 - Quality Control

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0040 - No_Prep_IC_1

Blank (B2I0040-BLK1)

Prepared: 9/5/2012 Analyzed: 9/5/2012

Chloride	ND	0.50			NR				
Nitrate as N	ND	0.10			NR				
Nitrite, as N	ND	0.10			NR				
Sulfate	ND	1.0			NR				

LCS (B2I0040-BS1)

Prepared: 9/5/2012 Analyzed: 9/5/2012

Chloride	0.966700	0.50	1.00000		96.7	90 - 110			
Nitrate as N	0.983000	0.10	1.00000		98.3	90 - 110			
Nitrite, as N	0.982600	0.10	1.00000		98.3	90 - 110			
Sulfate	1.97920	1.0	2.00000		99.0	90 - 110			

Matrix Spike (B2I0040-MS1)

Source: 1203106-01 Prepared: 9/5/2012 Analyzed: 9/5/2012

Chloride	88.6020	10	2.50000	87.1680	57.4	80 - 120		M3
Nitrate as N	2.95300	0.10	2.50000	0.326800	105	80 - 120		
Nitrite, as N	3.23320	0.10	2.50000	ND	129	80 - 120		M2
Sulfate	265.108	20	5.00000	260.720	87.8	80 - 120		

Matrix Spike Dup (B2I0040-MSD1)

Source: 1203106-01 Prepared: 9/5/2012 Analyzed: 9/5/2012

Chloride	88.4200	10	2.50000	87.1680	50.1	80 - 120	0.206	20	M3
Nitrate as N	2.82310	0.10	2.50000	0.326800	99.9	80 - 120	4.50	20	
Nitrite, as N	3.09860	0.10	2.50000	ND	124	80 - 120	4.25	20	M2
Sulfate	265.336	20	5.00000	260.720	92.3	80 - 120	0.0860	20	



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Perchlorate by IC EPA 314.0 - Quality Control

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0198 - No_Prep_IC_2

Blank (B2I0198-BLK1)									Prepared: 9/11/2012 Analyzed: 9/11/2012
Perchlorate	ND	2.0				NR			
LCS (B2I0198-BS1)									Prepared: 9/11/2012 Analyzed: 9/11/2012
Perchlorate	25.1509	2.0	25.0000		101	85 - 115			
Matrix Spike (B2I0198-MS1)				Source: 1203111-01					Prepared: 9/11/2012 Analyzed: 9/11/2012
Perchlorate	2.27080	2.0	100.000	ND	2.27	80 - 120			M2
Matrix Spike Dup (B2I0198-MSD1)				Source: 1203111-01					Prepared: 9/11/2012 Analyzed: 9/11/2012
Perchlorate	ND	2.0	100.000	ND	NR	80 - 120		15	M2



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Gases by GC (ASTM D1946) - Quality Control

Analyte	Result (ppmv)	PQL (ppmv)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0053 - No_Prep_Air

Blank (B2I0053-BLK1) Prepared: 9/6/2012 Analyzed: 9/6/2012

Methane ND 10 NR

LCS (B2I0053-BS1) Prepared: 9/6/2012 Analyzed: 9/6/2012

Methane 1033.79 10 1000.00 103 70 - 130

LCS Dup (B2I0053-BSD1) Prepared: 9/6/2012 Analyzed: 9/6/2012

Methane 1031.75 10 1000.00 103 70 - 130 0.197 20



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Oil & Grease, Hexane Extractable Material (HEM) EPA 1664A - Quality Control

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0215 - Prep_WC_2_W

Blank (B2I0215-BLK1)

Prepared: 9/11/2012 Analyzed: 9/11/2012

Oil & Grease, HEM

ND 2.0 NR

LCS (B2I0215-BS1)

Prepared: 9/11/2012 Analyzed: 9/11/2012

Oil & Grease, HEM

37.8000 2.0 40.0000 94.5 78 - 114

Matrix Spike (B2I0215-MS1)

Source: 1203105-02 Prepared: 9/11/2012 Analyzed: 9/11/2012

Oil & Grease, HEM

45.5814 2.3 46.5116 0.465116 97.0 78 - 114

Matrix Spike Dup (B2I0215-MSD1)

Source: 1203105-02 Prepared: 9/11/2012 Analyzed: 9/11/2012

Oil & Grease, HEM

44.8837 2.3 46.5116 0.465116 95.5 78 - 114 1.54 20



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Report To : Jay Neuhaus
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Total Petroleum Hydrocarbons, HEM/SGT EPA 1664A - Quality Control

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0222 - Prep_WC_2_W

Blank (B2I0222-BLK1)

Prepared: 9/11/2012 Analyzed: 9/11/2012

Total Petroleum Hydrocarbons

ND 2.0 NR

LCS (B2I0222-BS1)

Prepared: 9/11/2012 Analyzed: 9/11/2012

Total Petroleum Hydrocarbons

18.7000 2.0 20.0000 93.5 78 - 114

LCS Dup (B2I0222-BSD1)

Prepared: 9/11/2012 Analyzed: 9/11/2012

Total Petroleum Hydrocarbons

18.9000 2.0 20.0000 94.5 78 - 114 1.06 20



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Dissolved Gases in Water - Quality Control

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0139 - No_Prep_RSK

Blank (B2I0139-BLK1)

Prepared: 9/10/2012 Analyzed: 9/10/2012

Methane

ND 1.0

NR

LCS (B2I0139-BS1)

Prepared: 9/10/2012 Analyzed: 9/10/2012

Methane

102.370 1.0 96.2000 106 70 - 130

LCS Dup (B2I0139-BSD1)

Prepared: 9/10/2012 Analyzed: 9/10/2012

Methane

105.440 1.0 96.2000 110 70 - 130 2.95 20



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Hardness by Calculation by SM 2340B - Quality Control

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0202 - EPA 3010A

Blank (B2I0202-BLK1)

Prepared: 9/11/2012 Analyzed: 9/12/2012

Hardness Total (As CaCO₃)

ND 2.0 NR

LCS (B2I0202-BS1)

Prepared: 9/11/2012 Analyzed: 9/12/2012

Hardness Total (As CaCO₃)

137.163 2.0 NR 80 - 120

Matrix Spike (B2I0202-MS1)

Source: 1203138-03 Prepared: 9/11/2012 Analyzed: 9/12/2012

Hardness Total (As CaCO₃)

143.313 2.0 132.200 ND 108 80 - 120

Matrix Spike Dup (B2I0202-MSD1)

Source: 1203138-03 Prepared: 9/11/2012 Analyzed: 9/12/2012

Hardness Total (As CaCO₃)

150.631 2.0 132.200 ND 114 80 - 120 4.98 20



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Total Dissolved Solids (Residue, Filterable) by SM 2540C - Quality Control

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0206 - No_Prep_WC_1

Blank (B2I0206-BLK1)

Prepared: 9/10/2012 Analyzed: 9/10/2012

Residue, Dissolved ND 10 NR



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Total Dissolved Solids (Residue, Filterable) by SM 2540C - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0206 - No_Prep_WC_1 (continued)

LCS (B2I0206-BS1)

Prepared: 9/10/2012 Analyzed: 9/10/2012

Residue, Dissolved	994.000	10	970.000	102	80 - 120
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Total Dissolved Solids (Residue, Filterable) by SM 2540C - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0206 - No_Prep_WC_1 (continued)

Duplicate (B2I0206-DUP1) Source: 1203126-01 Prepared: 9/10/2012 Analyzed: 9/10/2012
Residue, Dissolved 1083.33 11 1068.89 NR 1.34 10



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Total Dissolved Solids (Residue, Filterable) by SM 2540C - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0206 - No_Prep_WC_1 (continued)

Duplicate (B2I0206-DUP2)

Source: 1203126-05

Prepared: 9/10/2012 Analyzed: 9/10/2012

Residue, Dissolved	ND	10	ND	NR	10
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Total Suspended Solids (Residue, Non-Filtrable) by SM 2540D - Quality Control

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0199 - No_Prep_WC_1

Blank (B2I0199-BLK1)

Prepared: 9/10/2012 Analyzed: 9/10/2012

Residue, Suspended ND 10 NR



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Total Suspended Solids (Residue, Non-Filtrable) by SM 2540D - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0199 - No_Prep_WC_1 (continued)

LCS (B2I0199-BS1)

Prepared: 9/10/2012 Analyzed: 9/10/2012

Residue, Suspended	99.0000	10	96.6000	102	80 - 120
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Total Suspended Solids (Residue, Non-Filtrable) by SM 2540D - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0199 - No_Prep_WC_1 (continued)

Duplicate (B2I0199-DUP1) Source: 1203126-01 Prepared: 9/10/2012 Analyzed: 9/10/2012
Residue, Suspended 70.0000 11 71.1111 NR 1.57 10



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Residue, Settleable by SM 2540F - Quality Control

Analyte	Result (mL/L)	PQL (mL/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0113 - No_Prep_WC_1

Blank (B2I0113-BLK1)

Prepared: 9/5/2012 Analyzed: 9/5/2012

Residue, Settleable	ND	0.10	NR
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Sulfide, Total by SM 4500-S=D - Quality Control

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0155 - Prep_WC_3_W

Blank (B2I0155-BLK1)

Prepared: 9/10/2012 Analyzed: 9/10/2012

Sulfide, Total	ND	0.01	NR
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Sulfide, Total by SM 4500-S=D - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0155 - Prep_WC_3_W (continued)

LCS (B2I0155-BS1)

Prepared: 9/10/2012 Analyzed: 9/10/2012

Sulfide, Total	0.102100	0.01	0.100000	102	80 - 120
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Sulfide, Total by SM 4500-S=D - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0155 - Prep_WC_3_W (continued)

Matrix Spike (B2I0155-MS1) **Source: 1203138-03** Prepared: 9/10/2012 Analyzed: 9/10/2012

Sulfide, Total 0.100100 0.01 0.100000 ND 100 70 - 120



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Sulfide, Total by SM 4500-S=D - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0155 - Prep_WC_3_W (continued)

Matrix Spike Dup (B2I0155-MSD1) **Source: 1203138-03** Prepared: 9/10/2012 Analyzed: 9/10/2012
Sulfide, Total 0.103500 0.01 0.100000 ND 104 70 - 120 3.34 20



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Sulfide, Dissolved by SM 4500-S=D - Quality Control

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0110 - Prep_WC_3_W

Blank (B2I0110-BLK1)

Prepared: 9/7/2012 Analyzed: 9/7/2012

Hydrogen sulfide ND 0.01 NR



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Sulfide, Dissolved by SM 4500-S=D - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0110 - Prep_WC_3_W (continued)

LCS (B2I0110-BS1)

Prepared: 9/7/2012 Analyzed: 9/7/2012

Hydrogen sulfide	0.102100	0.01	0.100000	102	80 - 120
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Sulfide, Dissolved by SM 4500-S=D - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0110 - Prep_WC_3_W (continued)

Matrix Spike (B2I0110-MS1) Source: 1203126-05 Prepared: 9/7/2012 Analyzed: 9/7/2012

Hydrogen sulfide	0.150392	0.01	0.100000	0.020513	130	80 - 120	M2
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Sulfide, Dissolved by SM 4500-S=D - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0110 - Prep_WC_3_W (continued)

Matrix Spike Dup (B2I0110-MSD1) **Source: 1203126-05** Prepared: 9/7/2012 Analyzed: 9/7/2012
Hydrogen sulfide 0.150605 0.01 0.100000 0.020513 130 80 - 120 0.142 20 M2



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Total Metals by ICP-AES EPA 6010B - Quality Control

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0102 - EPA 3010A

Blank (B2I0102-BLK1)

Prepared: 9/7/2012 Analyzed: 9/7/2012

Boron

ND 0.10

NR



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Total Metals by ICP-AES EPA 6010B - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0102 - EPA 3010A (continued)

LCS (B2I0102-BS1)

Prepared: 9/7/2012 Analyzed: 9/7/2012

Boron	22.6712	0.10	10.0000	227	80 - 120
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Total Metals by ICP-AES EPA 6010B - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0102 - EPA 3010A (continued)

Matrix Spike (B2I0102-MS1) **Source: 1203111-01** Prepared: 9/7/2012 Analyzed: 9/7/2012

Boron 21.7475 0.10 10.0000 1.59167 202 76 - 123



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Total Metals by ICP-AES EPA 6010B - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0102 - EPA 3010A (continued)

Matrix Spike Dup (B2I0102-MSD1) **Source: 1203111-01** Prepared: 9/7/2012 Analyzed: 9/7/2012

Boron	22.2696	0.10	10.0000	1.59167	207	76 - 123	2.37	20
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Reported : 09/14/2012

Title 22 Metals by ICP-AES EPA 6010B - Quality Control

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0202 - EPA 3010A

Blank (B2I0202-BLK1)

Prepared: 9/11/2012 Analyzed: 9/12/2012

Antimony	ND	0.005			NR				
Arsenic	ND	0.01			NR				
Barium	ND	0.003			NR				
Beryllium	ND	0.003			NR				
Cadmium	ND	0.003			NR				
Chromium	ND	0.003			NR				
Cobalt	ND	0.003			NR				
Copper	ND	0.005			NR				
Lead	ND	0.005			NR				
Molybdenum	ND	0.005			NR				
Nickel	ND	0.005			NR				
Selenium	ND	0.01			NR				
Silver	ND	0.003			NR				
Thallium	ND	0.02			NR				
Vanadium	ND	0.003			NR				
Zinc	ND	0.01			NR				



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Report To : Jay Neuhaus
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Title 22 Metals by ICP-AES EPA 6010B - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0202 - EPA 3010A (continued)

LCS (B2I0202-BS1)

Prepared: 9/11/2012 Analyzed: 9/12/2012

Antimony	1.07406	0.005	1.00000		107	80 - 120			
Arsenic	1.00604	0.01	1.00000		101	80 - 120			
Barium	1.01570	0.003	1.00000		102	80 - 120			
Beryllium	1.06328	0.003	1.00000		106	80 - 120			
Cadmium	1.01307	0.003	1.00000		101	80 - 120			
Chromium	1.03355	0.003	1.00000		103	80 - 120			
Cobalt	1.02919	0.003	1.00000		103	80 - 120			
Copper	1.06298	0.005	1.00000		106	80 - 120			
Lead	1.05970	0.005	1.00000		106	80 - 120			
Molybdenum	1.04432	0.005	1.00000		104	80 - 120			
Nickel	1.03441	0.005	1.00000		103	80 - 120			
Selenium	0.987441	0.01	1.00000		98.7	80 - 120			
Silver	1.07449	0.003	1.00000		107	80 - 120			
Thallium	1.09082	0.02	1.00000		109	80 - 120			
Vanadium	1.04381	0.003			NR	80 - 120			
Zinc	1.07111	0.01	1.00000		107	80 - 120			



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Title 22 Metals by ICP-AES EPA 6010B - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0202 - EPA 3010A (continued)

Matrix Spike (B2I0202-MS1)	Source: 1203138-03			Prepared: 9/11/2012 Analyzed: 9/12/2012					
Antimony	2.71542	0.005	2.50000	ND	109	77 - 123			
Arsenic	2.53358	0.01	2.50000	ND	101	80 - 118			
Barium	2.70582	0.003	2.50000	0.000577	108	78 - 120			
Beryllium	2.71249	0.003	2.50000	ND	108	81 - 120			
Cadmium	2.57329	0.003	2.50000	ND	103	76 - 117			
Chromium	2.66026	0.003	2.50000	ND	106	75 - 110			
Cobalt	2.65765	0.003	2.50000	ND	106	76 - 118			
Copper	2.69512	0.005	2.50000	ND	108	78 - 123			
Lead	2.57936	0.005	2.50000	ND	103	78 - 117			
Molybdenum	2.56773	0.005	2.50000	ND	103	81 - 115			
Nickel	2.64619	0.005	2.50000	ND	106	75 - 118			
Selenium	2.61583	0.01	2.50000	ND	105	78 - 116			
Silver	2.77792	0.003	2.50000	ND	111	80 - 122			
Thallium	2.78334	0.02	2.50000	ND	111	69 - 122			
Vanadium	2.69413	0.003	2.50000	ND	108	77 - 120			
Zinc	2.56984	0.01	2.50000	ND	103	73 - 119			



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Title 22 Metals by ICP-AES EPA 6010B - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0202 - EPA 3010A (continued)

Matrix Spike Dup (B2I0202-MSD1)	Source: 1203138-03			Prepared: 9/11/2012 Analyzed: 9/12/2012					
Antimony	2.86103	0.005	2.50000	ND	114	77 - 123	5.22	20	
Arsenic	2.66417	0.01	2.50000	ND	107	80 - 118	5.02	20	
Barium	2.83263	0.003	2.50000	0.000577	113	78 - 120	4.58	20	
Beryllium	2.84385	0.003	2.50000	ND	114	81 - 120	4.73	20	
Cadmium	2.69538	0.003	2.50000	ND	108	76 - 117	4.63	20	
Chromium	2.78284	0.003	2.50000	ND	111	75 - 110	4.50	20	M1
Cobalt	2.77927	0.003	2.50000	ND	111	76 - 118	4.47	20	
Copper	2.82631	0.005	2.50000	ND	113	78 - 123	4.75	20	
Lead	2.70101	0.005	2.50000	ND	108	78 - 117	4.61	20	
Molybdenum	2.67855	0.005	2.50000	ND	107	81 - 115	4.22	20	
Nickel	2.75638	0.005	2.50000	ND	110	75 - 118	4.08	20	
Selenium	2.73985	0.01	2.50000	ND	110	78 - 116	4.63	20	
Silver	2.90657	0.003	2.50000	ND	116	80 - 122	4.53	20	
Thallium	2.92601	0.02	2.50000	ND	117	69 - 122	5.00	20	
Vanadium	2.82041	0.003	2.50000	ND	113	77 - 120	4.58	20	
Zinc	2.68983	0.01	2.50000	ND	108	73 - 119	4.56	20	



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Mercury by AA (Cold Vapor) EPA 7470 - Quality Control

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0064 - EPA 245.1/7470

Blank (B2I0064-BLK1)

Prepared: 9/6/2012 Analyzed: 9/6/2012

Mercury	ND	0.20	NR
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Mercury by AA (Cold Vapor) EPA 7470 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0064 - EPA 245.1/7470 (continued)

LCS (B2I0064-BS1)

Prepared: 9/6/2012 Analyzed: 9/6/2012

Mercury	11.3097	0.20	10.0000	113	85 - 115
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Mercury by AA (Cold Vapor) EPA 7470 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0064 - EPA 245.1/7470 (continued)

Matrix Spike (B2I0064-MS1) **Source: 1203111-01** Prepared: 9/6/2012 Analyzed: 9/6/2012
Mercury 11.8287 0.20 10.0000 0.056236 118 70 - 130



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Mercury by AA (Cold Vapor) EPA 7470 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0064 - EPA 245.1/7470 (continued)

Matrix Spike (B2I0064-MS2) Source: 1203111-01 Prepared: 9/6/2012 Analyzed: 9/6/2012

Mercury 5.57649 5.00000 0.056236 110 70 - 130



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Mercury by AA (Cold Vapor) EPA 7470 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0064 - EPA 245.1/7470 (continued)

Matrix Spike Dup (B2I0064-MSD1) **Source: 1203111-01** Prepared: 9/6/2012 Analyzed: 9/6/2012

Mercury	11.6745	0.20	10.0000	0.056236	116	70 - 130	1.31	20
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Reported : 09/14/2012

Gasoline Range Organics by EPA 8015B - Quality Control

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0054 - GCVOAW

Blank (B2I0054-BLK1)

Prepared: 9/6/2012 Analyzed: 9/6/2012

Gasoline Range Organics	ND	0.05		NR					
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Surrogate: 4-Bromofluorobenzene 0.09994 0.100000 99.9 70 - 130



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Gasoline Range Organics by EPA 8015B - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0054 - GCVOAW (continued)

LCS (B2I0054-BS1)

Prepared: 9/6/2012 Analyzed: 9/6/2012

Gasoline Range Organics	0.887000	0.05	1.00000	88.7	70 - 130				
Surrogate: 4-Bromofluorobenzene	0.1039		0.100000	104	70 - 130				



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Gasoline Range Organics by EPA 8015B - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0054 - GCVOAW (continued)

LCS Dup (B2I0054-BSD1)

Prepared: 9/6/2012 Analyzed: 9/6/2012

Gasoline Range Organics	0.925000	0.05	1.00000	92.5	70 - 130	4.19	20
Surrogate: 4-Bromofluorobenzene	0.1057		0.100000	106	70 - 130		



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Diesel Range Organics by EPA 8015B - Quality Control

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0057 - GCSEMI_DRO

Blank (B2I0057-BLK1)

Prepared: 9/6/2012 Analyzed: 9/6/2012

DRO	ND	0.05		NR					
ORO	ND	0.05		NR					
Surrogate: p-Terphenyl	0.03908		8.00000E-2		48.8	48 - 124			



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Diesel Range Organics by EPA 8015B - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0057 - GCSEMI_DRO (continued)

LCS (B2I0057-BS1)

Prepared: 9/6/2012 Analyzed: 9/6/2012

DRO	0.691810	0.05	1.00000	69.2	45 - 109
Surrogate: <i>p-Terphenyl</i>	0.04286		8.00000E-2	53.6	48 - 124



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Diesel Range Organics by EPA 8015B - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0057 - GCSEMI_DRO (continued)

LCS Dup (B2I0057-BSD1)

Prepared: 9/6/2012 Analyzed: 9/6/2012

DRO	0.698650	0.05	1.00000		69.9	45 - 109	0.984	20	
Surrogate: <i>p</i> -Terphenyl	0.04235		8.00000E-2		52.9	48 - 124			



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Organochlorine Pesticides by EPA 8081 - Quality Control

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0121 - GCSEMI_PCB/PEST

Blank (B2I0121-BLK1)

Prepared: 9/6/2012 Analyzed: 9/10/2012

4,4'-DDD	ND	0.05			NR				
4,4'-DDD [2C]	ND	0.05			NR				
4,4'-DDE	ND	0.05			NR				
4,4'-DDE [2C]	ND	0.05			NR				
4,4'-DDT	ND	0.05			NR				
4,4'-DDT [2C]	ND	0.05			NR				
Aldrin	ND	0.02			NR				
Aldrin [2C]	ND	0.02			NR				
alpha-BHC	ND	0.02			NR				
alpha-BHC [2C]	ND	0.02			NR				
alpha-Chlordane	ND	0.02			NR				
alpha-Chlordane [2C]	ND	0.02			NR				
beta-BHC	ND	0.02			NR				
beta-BHC [2C]	ND	0.02			NR				
Chlordane	ND	0.25			NR				
Chlordane [2C]	ND	0.25			NR				
delta-BHC	ND	0.02			NR				
delta-BHC [2C]	ND	0.02			NR				
Dieldrin	ND	0.05			NR				
Dieldrin [2C]	ND	0.05			NR				
Endosulfan I	ND	0.02			NR				
Endosulfan I [2C]	ND	0.02			NR				
Endosulfan II	ND	0.05			NR				
Endosulfan II [2C]	ND	0.05			NR				
Endosulfan sulfate	ND	0.05			NR				
Endosulfan Sulfate [2C]	ND	0.05			NR				
Endrin	ND	0.05			NR				
Endrin [2C]	ND	0.05			NR				
Endrin aldehyde	ND	0.05			NR				
Endrin aldehyde [2C]	ND	0.05			NR				
Endrin ketone	ND	0.05			NR				
Endrin ketone [2C]	ND	0.05			NR				
gamma-BHC	ND	0.02			NR				
gamma-BHC [2C]	ND	0.02			NR				
gamma-Chlordane	ND	0.02			NR				
gamma-Chlordane [2C]	ND	0.02			NR				
Heptachlor	ND	0.02			NR				
Heptachlor [2C]	ND	0.02			NR				
Heptachlor epoxide	ND	0.02			NR				
Heptachlor epoxide [2C]	ND	0.02			NR				
Methoxychlor	ND	0.25			NR				



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Organochlorine Pesticides by EPA 8081 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0121 - GCSEMI_PCB/PEST (continued)

Blank (B2I0121-BLK1) - Continued

Prepared: 9/6/2012 Analyzed: 9/10/2012

Methoxychlor [2C]	ND	0.25			NR				
Toxaphene	ND	2.5			NR				
Toxaphene [2C]	ND	2.5			NR				
<i>Surrogate: Decachlorobiphenyl</i>	0.3992		0.500000		79.8	23 - 121			
<i>Surrogate: Decachlorobiphenyl [2C]</i>	0.4808		0.500000		96.2	23 - 121			
<i>Surrogate: Tetrachloro-m-xylene</i>	0.4336		0.500000		86.7	55 - 109			
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	0.4535		0.500000		90.7	55 - 109			



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Organochlorine Pesticides by EPA 8081 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B2I0121 - GCSEMI_PCB/PEST (continued)									
LCS (B2I0121-BS1)									
					Prepared: 9/6/2012	Analyzed: 9/10/2012			
4,4'-DDT	0.408830	0.05	0.500000		81.8	54 - 109			
4,4'-DDT [2C]	0.468865	0.05	0.500000		93.8	54 - 109			
Aldrin	0.470500	0.02	0.500000		94.1	56 - 110			
Aldrin [2C]	0.439530	0.02	0.500000		87.9	56 - 110			
Dieldrin	0.450155	0.05	0.500000		90.0	57 - 113			
Dieldrin [2C]	0.455840	0.05	0.500000		91.2	57 - 113			
Endrin	0.410855	0.05	0.500000		82.2	53 - 129			
Endrin [2C]	0.436925	0.05	0.500000		87.4	53 - 129			
gamma-BHC	0.469085	0.02	0.500000		93.8	60 - 111			
gamma-BHC [2C]	0.448415	0.02	0.500000		89.7	60 - 111			
Heptachlor	0.474460	0.02	0.500000		94.9	56 - 116			
Heptachlor [2C]	0.453920	0.02	0.500000		90.8	56 - 116			
<i>Surrogate: Decachlorobiphenyl</i>	0.4204		0.500000		84.1	23 - 121			
<i>Surrogate: Decachlorobiphenyl [2C]</i>	0.4654		0.500000		93.1	23 - 121			
<i>Surrogate: Tetrachloro-m-xylene</i>	0.4342		0.500000		86.8	55 - 109			
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	0.4331		0.500000		86.6	55 - 109			



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Organochlorine Pesticides by EPA 8081 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
Batch B2I0121 - GCSEMI_PCB/PEST (continued)									
LCS Dup (B2I0121-BSD1)									
					Prepared: 9/6/2012	Analyzed: 9/10/2012			
4,4'-DDT	0.388920	0.05	0.500000		77.8	54 - 109	4.99	20	
4,4'-DDT [2C]	0.449285	0.05	0.500000		89.9	54 - 109	4.27	20	
Aldrin	0.454645	0.02	0.500000		90.9	56 - 110	3.43	20	
Aldrin [2C]	0.425810	0.02	0.500000		85.2	56 - 110	3.17	20	
Dieldrin	0.426805	0.05	0.500000		85.4	57 - 113	5.33	20	
Dieldrin [2C]	0.432145	0.05	0.500000		86.4	57 - 113	5.34	20	
Endrin	0.389680	0.05	0.500000		77.9	53 - 129	5.29	20	
Endrin [2C]	0.417715	0.05	0.500000		83.5	53 - 129	4.50	20	
gamma-BHC	0.454670	0.02	0.500000		90.9	60 - 111	3.12	20	
gamma-BHC [2C]	0.435155	0.02	0.500000		87.0	60 - 111	3.00	20	
Heptachlor	0.464935	0.02	0.500000		93.0	56 - 116	2.03	20	
Heptachlor [2C]	0.442890	0.02	0.500000		88.6	56 - 116	2.46	20	
<i>Surrogate: Decachlorobiphenyl</i>	0.3354		0.500000		67.1	23 - 121			
<i>Surrogate: Decachlorobiphenyl [2C]</i>	0.4395		0.500000		87.9	23 - 121			
<i>Surrogate: Tetrachloro-m-xylene</i>	0.4247		0.500000		84.9	55 - 109			
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	0.4262		0.500000		85.2	55 - 109			



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Report To : Jay Neuhaus
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Polychlorinated Biphenyls by EPA 8082 - Quality Control

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0121 - GCSEMI_PCB/PEST

Blank (B2I0121-BLK2)

Prepared: 9/6/2012 Analyzed: 9/10/2012

Aroclor 1016	ND	0.50		NR					
Aroclor 1221	ND	1.0		NR					
Aroclor 1232	ND	0.50		NR					
Aroclor 1242	ND	0.50		NR					
Aroclor 1248	ND	0.50		NR					
Aroclor 1254	ND	0.50		NR					
Aroclor 1260	ND	0.50		NR					
Aroclor 1262	ND	0.50		NR					
Aroclor 1268	ND	0.50		NR					
Surrogate: Decachlorobiphenyl	0.4733		0.500000		94.7		41 - 106		
Surrogate: Tetrachloro-m-xylene	0.4273		0.500000		85.5		48 - 108		



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Polychlorinated Biphenyls by EPA 8082 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec	Limits	RPD	RPD Limit	Notes
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Batch B2I0121 - GCSEMI_PCB/PEST (continued)

LCS (B2I0121-BS2)

Prepared: 9/6/2012 Analyzed: 9/10/2012

Aroclor 1016	4.08224	0.50	5.00000	81.6	52 - 104
Aroclor 1260	3.89650	0.50	5.00000	77.9	55 - 115
Surrogate: Decachlorobiphenyl	0.4679		0.500000	93.6	41 - 106
Surrogate: Tetrachloro-m-xylene	0.4169		0.500000	83.4	48 - 108



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Polychlorinated Biphenyls by EPA 8082 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0121 - GCSEMI_PCB/PEST (continued)

LCS Dup (B2I0121-BSD2)

Prepared: 9/6/2012 Analyzed: 9/10/2012

Aroclor 1016	4.24638	0.50	5.00000	84.9	52 - 104	3.94	20
Aroclor 1260	3.94646	0.50	5.00000	78.9	55 - 115	1.27	20
Surrogate: Decachlorobiphenyl	0.4619		0.500000	92.4	41 - 106		
Surrogate: Tetrachloro-m-xylene	0.4137		0.500000	82.7	48 - 108		



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Volatile Organic Compounds by EPA 8260 - Quality Control

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0091 - MSVOAW_LL

Blank (B2I0091-BLK1)

Prepared: 9/7/2012 Analyzed: 9/7/2012

1,1,1,2-Tetrachloroethane	ND	0.50			NR				
1,1,1-Trichloroethane	ND	0.50			NR				
1,1,2,2-Tetrachloroethane	ND	0.50			NR				
1,1,2-Trichloroethane	ND	0.50			NR				
1,1-Dichloroethane	ND	0.50			NR				
1,1-Dichloroethene	ND	0.50			NR				
1,1-Dichloropropene	ND	0.50			NR				
1,2,3-Trichloropropane	ND	0.50			NR				
1,2,3-Trichlorobenzene	ND	0.50			NR				
1,2,4-Trichlorobenzene	ND	0.50			NR				
1,2,4-Trimethylbenzene	ND	0.50			NR				
1,2-Dibromo-3-chloropropane	ND	0.50			NR				
1,2-Dibromoethane	ND	0.50			NR				
1,2-Dichlorobenzene	ND	0.50			NR				
1,2-Dichloroethane	ND	0.50			NR				
1,2-Dichloropropene	ND	0.50			NR				
1,3,5-Trimethylbenzene	ND	0.50			NR				
1,3-Dichlorobenzene	ND	0.50			NR				
1,3-Dichloropropane	ND	0.50			NR				
1,4-Dichlorobenzene	ND	0.50			NR				
2,2-Dichloropropane	ND	0.50			NR				
2-Chloroethyl vinyl ether	ND	0.50			NR				
2-Chlorotoluene	ND	0.50			NR				
4-Chlorotoluene	ND	0.50			NR				
4-Isopropyltoluene	ND	0.50			NR				
Benzene	ND	0.50			NR				
Bromobenzene	ND	0.50			NR				
Bromochloromethane	ND	0.50			NR				
Bromodichloromethane	ND	0.50			NR				
Bromoform	ND	0.50			NR				
Bromomethane	ND	0.50			NR				
Carbon disulfide	ND	1.0			NR				
Carbon tetrachloride	ND	0.50			NR				
Chlorobenzene	ND	0.50			NR				
Chloroethane	ND	0.50			NR				
Chloroform	ND	0.50			NR				
Chloromethane	ND	0.50			NR				
cis-1,2-Dichloroethene	ND	0.50			NR				
cis-1,3-Dichloropropene	ND	0.50			NR				
Di-isopropyl ether	ND	0.50			NR				
Dibromochloromethane	ND	0.50			NR				



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Volatile Organic Compounds by EPA 8260 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0091 - MSVOAW_LL (continued)

Blank (B2I0091-BLK1) - Continued

Prepared: 9/7/2012 Analyzed: 9/7/2012

Dibromomethane	ND	0.50		NR
Dichlorodifluoromethane	ND	0.50		NR
Ethyl Acetate	ND	10		NR
Ethyl Ether	ND	10		NR
Ethyl tert-butyl ether	ND	0.50		NR
Ethylbenzene	ND	0.50		NR
Freon-113	ND	0.50		NR
Hexachlorobutadiene	ND	0.50		NR
Isopropylbenzene	ND	0.50		NR
m,p-Xylene	ND	1.0		NR
Methylene chloride	ND	1.0		NR
MTBE	ND	0.50		NR
n-Butylbenzene	ND	0.50		NR
n-Propylbenzene	ND	0.50		NR
Naphthalene	ND	0.50		NR
o-Xylene	ND	0.50		NR
sec-Butylbenzene	ND	0.50		NR
Styrene	ND	0.50		NR
tert-Amyl methyl ether	ND	0.50		NR
tert-Butanol	ND	10		NR
tert-Butylbenzene	ND	0.50		NR
Tetrachloroethene	ND	0.50		NR
Toluene	ND	0.50		NR
trans-1,2-Dichloroethene	ND	0.50		NR
trans-1,3-Dichloropropene	ND	0.50		NR
Trichloroethene	ND	0.50		NR
Trichlorofluoromethane	ND	0.50		NR
Vinyl acetate	ND	10		NR
Vinyl chloride	ND	0.50		NR
<i>Surrogate: 1,2-Dichloroethane-d4</i>	25.76	25.0000	103	70 - 130
<i>Surrogate: 4-Bromofluorobenzene</i>	24.69	25.0000	98.8	70 - 130
<i>Surrogate: Dibromofluoromethane</i>	26.52	25.0000	106	70 - 130
<i>Surrogate: Toluene-d8</i>	26.14	25.0000	105	70 - 130



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Volatile Organic Compounds by EPA 8260 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0091 - MSVOAW_LL (continued)

LCS (B2I0091-BS1)

Prepared: 9/7/2012 Analyzed: 9/7/2012

1,1-Dichloroethene	21.0000	20.0000		105	70 - 130
Benzene	40.2700	40.0000		101	70 - 130
Chlorobenzene	19.4100	20.0000		97.0	70 - 130
MTBE	19.6500	20.0000		98.2	70 - 130
Toluene	40.1700	40.0000		100	70 - 130
Trichloroethene	19.6600	20.0000		98.3	70 - 130
<i>Surrogate: 1,2-Dichloroethane-d4</i>	24.40	25.0000		97.6	70 - 130
<i>Surrogate: 4-Bromofluorobenzene</i>	25.66	25.0000		103	70 - 130
<i>Surrogate: Dibromofluoromethane</i>	25.19	25.0000		101	70 - 130
<i>Surrogate: Toluene-d8</i>	25.46	25.0000		102	70 - 130



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Volatile Organic Compounds by EPA 8260 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0091 - MSVOAW_LL (continued)

LCS Dup (B2I0091-BSD1)

Prepared: 9/7/2012 Analyzed: 9/7/2012

1,1-Dichloroethene	20.5500	20.0000		103	70 - 130	2.17	20
Benzene	40.3500	40.0000		101	70 - 130	0.198	20
Chlorobenzene	19.8800	20.0000		99.4	70 - 130	2.39	20
MTBE	20.5200	20.0000		103	70 - 130	4.33	20
Toluene	38.2100	40.0000		95.5	70 - 130	5.00	20
Trichloroethene	19.6500	20.0000		98.2	70 - 130	0.0509	20
<i>Surrogate: 1,2-Dichloroethane-d4</i>	24.74	25.0000		99.0	70 - 130		
<i>Surrogate: 4-Bromofluorobenzene</i>	26.11	25.0000		104	70 - 130		
<i>Surrogate: Dibromofluoromethane</i>	25.54	25.0000		102	70 - 130		
<i>Surrogate: Toluene-d8</i>	24.53	25.0000		98.1	70 - 130		



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Semivolatile Organic Compounds by EPA 8270C - Quality Control

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0044 - MSSEMI_ISOTOPEDILN

Blank (B2I0044-BLK1)

Prepared: 9/5/2012 Analyzed: 9/6/2012

1,2,4-Trichlorobenzene	ND	10			NR				
1,2-Dichlorobenzene	ND	10			NR				
1,3-Dichlorobenzene	ND	10			NR				
1,4-Dichlorobenzene	ND	10			NR				
2,4,5-Trichlorophenol	ND	10			NR				
2,4,6-Trichlorophenol	ND	10			NR				
2,4-Dichlorophenol	ND	10			NR				
2,4-Dimethylphenol	ND	10			NR				
2,4-Dinitrophenol	ND	50			NR				
2,4-Dinitrotoluene	ND	10			NR				
2,6-Dinitrotoluene	ND	10			NR				
2-Chloronaphthalene	ND	10			NR				
2-Chlorophenol	ND	10			NR				
2-Methylnaphthalene	ND	10			NR				
2-Methylphenol	ND	10			NR				
2-Nitroaniline	ND	50			NR				
2-Nitrophenol	ND	10			NR				
3,3'-Dichlorobenzidine	ND	20			NR				
3-Nitroaniline	ND	50			NR				
4,6-Dinitro-2-methyphenol	ND	50			NR				
4-Bromophenyl-phenylether	ND	10			NR				
4-Chloro-3-methylphenol	ND	50			NR				
4-Chloroaniline	ND	20			NR				
4-Chlorophenyl-phenylether	ND	10			NR				
4-Methylphenol	ND	10			NR				
4-Nitroaniline	ND	20			NR				
4-Nitrophenol	ND	50			NR				
Acenaphthene	ND	10			NR				
Acenaphthylene	ND	10			NR				
Anthracene	ND	10			NR				
Benzidine (M)	ND	50			NR				
Benzo(a)anthracene	ND	10			NR				
Benzo(a)pyrene	ND	10			NR				
Benzo(b)fluoranthene	ND	10			NR				
Benzo(g,h,i)perylene	ND	10			NR				
Benzo(k)fluoranthene	ND	10			NR				
Benzoic acid	ND	50			NR				
Benzyl alcohol	ND	20			NR				
bis(2-chloroethoxy)methane	ND	10			NR				
bis(2-Chloroethyl)ether	ND	10			NR				
bis(2-chloroisopropyl)ether	ND	10			NR				



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Semivolatile Organic Compounds by EPA 8270C - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
Batch B2I0044 - MSSEMI_ISOTOPEDILN (continued)									
Blank (B2I0044-BLK1) - Continued									
Prepared: 9/5/2012 Analyzed: 9/6/2012									
bis(2-ethylhexyl)phthalate	ND	10			NR				
Butylbenzylphthalate	ND	10			NR				
Chrysene	ND	10			NR				
Di-n-butylphthalate	ND	10			NR				
Di-n-octylphthalate	ND	10			NR				
Dibenz(a,h)anthracene	ND	10			NR				
Dibenzofuran	ND	10			NR				
Diethyl phthalate	ND	10			NR				
Dimethyl phthalate	ND	10			NR				
Fluoranthene	ND	10			NR				
Fluorene	ND	10			NR				
Hexachlorobenzene	ND	10			NR				
Hexachlorobutadiene	ND	20			NR				
Hexachlorocyclopentadiene	ND	10			NR				
Hexachloroethane	ND	10			NR				
Indeno(1,2,3-cd)pyrene	ND	10			NR				
Isophorone	ND	10			NR				
N-Nitroso-di-n propylamine	ND	10			NR				
N-Nitrosodiphenylamine	ND	10			NR				
Naphthalene	ND	10			NR				
Nitrobenzene	ND	10			NR				
Pentachlorophenol	ND	50			NR				
Phenanthrene	ND	10			NR				
Phenol	ND	10			NR				
Pyrene	ND	10			NR				
Pyridine	ND	50			NR				

Surrogate: 1,2-Dichlorobenzene-d4	76.79	100.000	76.8	37 - 93
Surrogate: 2,4,6-Tribromophenol	92.68	100.000	92.7	46 - 125
Surrogate: 2-Chlorophenol-d4	72.84	100.000	72.8	36 - 83
Surrogate: 2-Fluorobiphenyl	81.08	100.000	81.1	51 - 100
Surrogate: 2-Fluorophenol	48.43	100.000	48.4	17 - 56
Surrogate: 4-Terphenyl-d14	98.04	100.000	98.0	58 - 113
Surrogate: Nitrobenzene-d5	80.93	100.000	80.9	39 - 95
Surrogate: Phenol-d5	37.73	100.000	37.7	13 - 45



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Semivolatile Organic Compounds by EPA 8270C - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD	RPD Limit	Notes
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Batch B2I0044 - MSSEMI_ISOTOPEDILN (continued)

LCS (B2I0044-BS1)

Prepared: 9/5/2012 Analyzed: 9/6/2012

1,2,4-Trichlorobenzene	79.9400	10	100.000	79.9	59 - 95
1,4-Dichlorobenzene	75.4400	10	100.000	75.4	50 - 87
2,4-Dinitrotoluene	100.360	10	100.000	100	72 - 145
2-Chlorophenol	79.1600	10	100.000	79.2	40 - 94
4-Chloro-3-methylphenol	99.1400	50	100.000	99.1	61 - 122
4-Nitrophenol	62.9300	50	100.000	62.9	30 - 70
Acenaphthene	83.6500	10	100.000	83.6	75 - 105
N-Nitroso-di-n propylamine	88.7700	10	100.000	88.8	69 - 93
Pentachlorophenol	127.630	50	100.000	128	47 - 136
Phenol	47.7400	10	100.000	47.7	25 - 48
Pyrene	83.8500	10	100.000	83.8	83 - 110
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	73.07		100.000	73.1	37 - 93
<i>Surrogate: 2,4,6-Tribromophenol</i>	99.30		100.000	99.3	46 - 125
<i>Surrogate: 2-Chlorophenol-d4</i>	71.99		100.000	72.0	36 - 83
<i>Surrogate: 2-Fluorobiphenyl</i>	76.02		100.000	76.0	51 - 100
<i>Surrogate: 2-Fluorophenol</i>	47.88		100.000	47.9	17 - 56
<i>Surrogate: 4-Terphenyl-d14</i>	97.88		100.000	97.9	58 - 113
<i>Surrogate: Nitrobenzene-d5</i>	78.75		100.000	78.8	39 - 95
<i>Surrogate: Phenol-d5</i>	39.26		100.000	39.3	13 - 45



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Semivolatile Organic Compounds by EPA 8270C - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0044 - MSSEMI_ISOTOPEDILN (continued)

LCS Dup (B2I0044-BSD1)

Prepared: 9/5/2012 Analyzed: 9/6/2012

1,2,4-Trichlorobenzene	79.3300	10	100.000	79.3	59 - 95	0.766	20		
1,4-Dichlorobenzene	75.2700	10	100.000	75.3	50 - 87	0.226	20		
2,4-Dinitrotoluene	104.250	10	100.000	104	72 - 145	3.80	20		
2-Chlorophenol	77.9300	10	100.000	77.9	40 - 94	1.57	20		
4-Chloro-3-methylphenol	101.010	50	100.000	101	61 - 122	1.87	20		
4-Nitrophenol	66.1300	50	100.000	66.1	30 - 70	4.96	20		
Acenaphthene	85.3800	10	100.000	85.4	75 - 105	2.05	20		
N-Nitroso-di-n propylamine	88.8000	10	100.000	88.8	69 - 93	0.0338	20		
Pentachlorophenol	101.950	50	100.000	102	47 - 136	22.4	20	R	
Phenol	47.5400	10	100.000	47.5	25 - 48	0.420	20		
Pyrene	87.3800	10	100.000	87.4	83 - 110	4.12	20		
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	72.37		100.000	72.4	37 - 93				
<i>Surrogate: 2,4,6-Tribromophenol</i>	104.5		100.000	104	46 - 125				
<i>Surrogate: 2-Chlorophenol-d4</i>	70.22		100.000	70.2	36 - 83				
<i>Surrogate: 2-Fluorobiphenyl</i>	77.67		100.000	77.7	51 - 100				
<i>Surrogate: 2-Fluorophenol</i>	47.43		100.000	47.4	17 - 56				
<i>Surrogate: 4-Terphenyl-d14</i>	96.71		100.000	96.7	58 - 113				
<i>Surrogate: Nitrobenzene-d5</i>	78.39		100.000	78.4	39 - 95				
<i>Surrogate: Phenol-d5</i>	38.58		100.000	38.6	13 - 45				



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1,4-Dioxane by EPA 8270/SIM: Isotope Dilution Technique - Quality Control

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0203 - MSSEMI

Blank (B2I0203-BLK1)

Prepared: 9/11/2012 Analyzed: 9/11/2012

1,4-Dioxane	ND	0.20			NR				
Surrogate: 1,2-Dichlorobenzene-d4	0.8578		1.00000		85.8	36 - 107			
Surrogate: 2-Fluorobiphenyl	1.038		1.00000		104	42 - 120			
Surrogate: 4-Terphenyl-d14	0.8896		1.00000		89.0	67 - 142			
Surrogate: Nitrobenzene-d5	0.5537		1.00000		55.4	36 - 130			



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1,4-Dioxane by EPA 8270/SIM: Isotope Dilution Technique - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0203 - MSSEMI (continued)

LCS (B2I0203-BS1)

Prepared: 9/11/2012 Analyzed: 9/12/2012

1,4-Dioxane	0.863110	0.20	1.00000		86.3	70 - 130			
Surrogate: 1,2-Dichlorobenzene-d4	0.8214		1.00000		82.1	36 - 107			
Surrogate: 2-Fluorobiphenyl	1.026		1.00000		103	42 - 120			
Surrogate: 4-Terphenyl-d14	0.8236		1.00000		82.4	67 - 142			
Surrogate: Nitrobenzene-d5	0.5224		1.00000		52.2	36 - 130			



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Project Number : Westside Extension, 4953111421
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1,4-Dioxane by EPA 8270/SIM: Isotope Dilution Technique - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
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Batch B2I0203 - MSSEMI (continued)

LCS Dup (B2I0203-BSD1)

Prepared: 9/11/2012 Analyzed: 9/12/2012

1,4-Dioxane	0.895700	0.20	1.00000		89.6	70 - 130	3.71	20	
Surrogate: 1,2-Dichlorobenzene-d4	0.8731		1.00000		87.3	36 - 107			
Surrogate: 2-Fluorobiphenyl	1.042		1.00000		104	42 - 120			
Surrogate: 4-Terphenyl-d14	0.8484		1.00000		84.8	67 - 142			
Surrogate: Nitrobenzene-d5	0.5347		1.00000		53.5	36 - 130			



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Reported : 09/14/2012

pH by EPA 9040B - Quality Control

Analyte	Result (pH Units)	PQL (pH Units)	Spike Level	Source Result	% Rec % Rec	% Rec Limits	RPD RPD	RPD Limit	Notes
---------	----------------------	-------------------	----------------	------------------	----------------	-----------------	------------	--------------	-------

Batch B2I0028 - No_Prep_WC_1

Duplicate (B2I0028-DUP1) Source: 1203111-01 Prepared: 9/4/2012 Analyzed: 9/4/2012
pH 7.26000 0.10 7.22000 NR 0.552 20



Certificate of Analysis

AMEC
6001 Rickenbacker Road
Los Angeles , CA 90040-3031

Project Number : Westside Extension, 4953111421
Report To : Jay Neuhaus
Reported : 09/14/2012

Notes and Definitions

R	RPD value outside acceptance criteria. Calculation is based on raw values.
M3	Matrix spike recovery outside of acceptance limit due to disproportionate concentration of the analyte to spike level. The analytical batch was validated by the laboratory control sample.
M2	Matrix spike recovery outside of acceptance limit due to possible matrix interference. The analytical batch was validated by the laboratory control sample.
M1	Matrix spike recovery outside of acceptance limit. The analytical batch was validated by the laboratory control sample.
D1	Sample required dilution due to possible matrix interference.
ND	Analyte not detected at or above reporting limit
PQL	Practical Quantitation Limit
MDL	Method Detection Limit
NR	Not Reported
RPD	Relative Percent Difference
CA1	CA-NELAP (CDPH)
CA2	CA-ELAP (CDPH)
OR1	OR-NELAP (OSPHL)
TX1	TX-NELAP (TCEQ)



American Environmental Testing Laboratory Inc.

2834 & 2908 North Naomi Street Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181
Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com

Ordered By

Advanced Technology Laboratories
3275 Walnut Street
Signal Hill, CA 90755-5225

Number of Pages 2

Date Received 09/05/2012

Date Reported 09/13/2012

Telephone: (562)989-4045
Attention: Rachelle Arada

Job Number	Order Date	Client
66749	09/05/2012	ATL

Project ID: 1203111
Project Name: PO# SC07473

Enclosed please find results of analyses of 1 water sample which was analyzed as specified on the attached chain of custody. If there are any questions, please do not hesitate to call.

Checked By:

Approved By:

Cyrus Razmara, Ph.D.
Laboratory Director



American Environmental Testing Laboratory Inc.

2834 & 2908 North Naomi Street Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181

Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com

Page: 1 A

Ordered By

Advanced Technology Laboratories
3275 Walnut Street
Signal Hill, CA 90755-5225

Project ID: 1203111

Date Received 09/05/2012

Date Reported 09/13/2012

Telephone: (562) 989-4045
Attention: Rachelle Arada

Job Number	Order Date	Client
66749	09/05/2012	ATL

CERTIFICATE OF ANALYSIS CASE NARRATIVE

AETL received 1 samples with the following specification on 09/05/2012.

Lab ID	Sample ID	Sample Date	Matrix	QTY of Containers
66749.01	1203111-01	09/04/2012	Aqueous	1

The samples were analyzed as specified on the enclosed chain of custody.
No analytical non-conformances were encountered.

Checked By: _____

Approved By: _____

Cyrus Razmara, Ph.D.
Laboratory Director



American Environmental Testing Laboratory Inc.

2834 & 2908 North Naomi Street Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181
Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com

ANALYTICAL RESULTS

Ordered By

Advanced Technology Laboratories
3275 Walnut Street
Signal Hill, CA 90755-5225

Telephone: (562)989-4045

Attn: Rachelle Arada

Page: 2

Project ID: 1203111

Project Name: PO# SC07473

AETL Job Number	Submitted	Client
66749	09/05/2012	ATL

Method: 310.1, Alkalinity, Titrimetric (pH 4.5), (EPA/600/4-79-020)

QC Batch No: 090512-1

Our Lab I.D.		Method Blank	66749.01			
Client Sample I.D.			1203111-01			
Date Sampled			09/04/2012			
Date Prepared		09/05/2012	09/05/2012			
Preparation Method		310.1	310.1			
Date Analyzed		09/05/2012	09/05/2012			
Matrix		Aqueous	Aqueous			
Units		mg/L	mg/L			
Dilution Factor		1	1			
Analytes	MDL	PQL	Results	Results		
Alkalinity, Bicarbonate	2.0	2.0	ND	715		
Alkalinity, Carbonate	2.0	2.0	ND	ND		
Alkalinity, Hydroxide	2.0	2.0	ND	ND		
Alkalinity, Total	2.0	2.0	ND	715		

QUALITY CONTROL REPORT

QC Batch No: 090512-1; Dup or Spiked Sample: 66715.01; LCS: Clean Water; QC Prepared: 09/05/2012; QC Analyzed: 09/05/2012;
Units: mg/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Alkalinity, Bicarbonate	160	20.0	180	100	20.0	180	100	<1	80-120	<15
Alkalinity, Total	160	20.0	180	100	20.0	180	100	<1	80-120	<15

QC Batch No: 090512-1; Dup or Spiked Sample: 66715.01; LCS: Clean Water; QC Prepared: 09/05/2012; QC Analyzed: 09/05/2012;
Units: mg/L

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
Alkalinity, Bicarbonate	160	160	<1	<15	20.0	20.0	100	80-120		
Alkalinity, Total	160	160	<1	<15	20.0	20.0	100	80-120		



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Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com

Data Qualifiers and Descriptors

Data Qualifier:

- #: Recovery is not within acceptable control limits.
- *: In the QC section, sample results have been taken directly from the ICP reading. No preparation factor has been applied.
- B: Analyte was present in the Method Blank.
- D: Result is from a diluted analysis.
- E: Result is beyond calibration limits and is estimated.
- H: Analysis was performed over the allowed holding time due to circumstances which were beyond laboratory control.
- J: Analyte was detected . However, the analyte concentration is an estimated value, which is between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL).
- M: Matrix spike recovery is outside control limits due to matrix interference. Laboratory Control Sample recovery was acceptable.
- MCL: Maximum Contaminant Level
- NS: No Standard Available
- S6: Surrogate recovery is outside control limits due to matrix interference.
- S8: The analysis of the sample required a dilution such that the surrogate concentration was diluted below the method acceptance criteria.
- X: Results represent LCS and LCSD data.

Definition:

- %Limi: Percent acceptable limits.
- %REC: Percent recovery.
- Con.L: Acceptable Control Limits
- Conce: Added concentration to the sample.
- LCS: Laboratory Control Sample
- MDL: Method Detection Limit is a statistically derived number which is specific for each instrument; each method, and each compound. It indicates a distinctively detectable quantity with 99% probability.



American Environmental Testing Laboratory Inc.

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Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com

Data Qualifiers and Descriptors

MS: Matrix Spike

MS DU: Matrix Spike Duplicate

ND: Analyte was not detected in the sample at or above MDL.

PQL: Practical Quantitation Limit or ML (Minimum Level as per RWQCB) is the minimum concentration that can be quantified with more than 99% confidence. Taking into account all aspects of the entire analytical instrumentation and practice.

Recov: Recovered concentration in the sample.

RPD: Relative Percent Difference

**ADVANCED TECHNOLOGY
LABORATORIES**

SUBCONTRACT ORDER

Work Order: 1203111

Job # 66749

SENDING LABORATORY:

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Phone: 562.989.4045
Fax: 562.989.6348
Project Manager: Rachelle Arada

RECEIVING LABORATORY:

AETL
2834 North Naomi Street
Burbank, CA 91504
Phone :(818) 845-8200
Fax: (818) 845-8840
PO#: SC07473 - Standard TAT *(RA)*

IMPORTANT : Please include Work Order # and PO # in your invoice.

Analysis	Due	Expires	Sampled	Comments
ATL Lab#: 1203111-01 / E-121A-GW 310.1_2320B_Total_SUB	09/11/12 17:00	09/18/12 11:00	Water	09/04/12 11:00 <i>66749.01</i> Report Carbonate

<i>Rachelle</i>	<i>9/4/12</i>	<i>9/5/12</i>	<i>1220</i>
<i>Rachelle</i>	<i>9/4/12</i>	<i>9/5/12</i>	<i>1220</i>

Figure F-1.150



AMERICAN SCIENTIFIC LABORATORIES, LLC

Environmental Testing Services

2520 N. San Fernando Rd., Los Angeles, CA 90065 Tel: (323) 223-9700 Fax: (323) 223-9500

Ordered By

Advanced Technology Laboratories
3275 Walnut Ave.
Signal Hill, CA 90755-5225

Number of Pages 2

Date Received 09/05/2012

Date Reported 09/12/2012

Telephone (562) 989-4045
Attn Rachelle Arada

Job Number	Ordered	Client
54638	09/05/2012	ATL

Project ID: 1203111

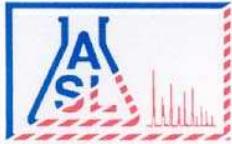
Project Name:

Enclosed are the results of analyses on 1 sample analyzed as specified on attached chain of custody.

Amolk MOLKY Brar
Laboratory Manager

American Scientific Laboratories, LLC (ASL) accepts sample materials from clients for analysis with the assumption that all of the information provided to ASL verbally or in writing by our clients (and/or their agents), regarding samples being submitted to ASL, is complete and accurate. ASL accepts all samples subject to the following conditions:

- 1) ASL is not responsible for verifying any client-provided information regarding any samples submitted to the laboratory.
- 2) ASL is not responsible for any consequences resulting from any inaccuracies, omissions, or misrepresentations contained in client-provided information regarding samples submitted to the laboratory.



AMERICAN SCIENTIFIC LABORATORIES, LLC

Environmental Testing Services

2520 N. San Fernando Rd., Los Angeles, CA 90065 Tel: (323) 223-9700 Fax: (323) 223-9500

ANALYTICAL RESULTS

Ordered By

Advanced Technology Laboratories
3275 Walnut Ave.
Signal Hill, CA 90755-5225

Telephone: (562)989-4045

Attn: Rachelle Arada

Page: **2**

Project ID: 1203111

ASL Job Number	Submitted	Client
54638	09/05/2012	ATL

Method: SM5210B, Biochemical Oxygen Demand (BOD)

QC Batch No: 091112-1

Our Lab I.D.		287838					
Client Sample I.D.		1203111					
Date Sampled		09/04/2012					
Date Prepared		09/06/2012					
Preparation Method							
Date Analyzed		09/11/2012					
Matrix		Water					
Units		mg/L					
Dilution Factor		1					
Analytes	PQL	Results					
Conventional							
BOD @ 20C	5.00	ND					

QUALITY CONTROL REPORT

QC Batch No: 091112-1

Analytes	LCS % REC	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit					
Conventional										
BOD @ 20C	102	98	4.0	80-120	20					

ADVANCED  TECHNOLOGY
LABORATORIES

SUBCONTRACT ORDER

Work Order: 1203111

ASL JOB # 54638

SENDING LABORATORY:

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Phone: 562.989.4045
Fax: 562.989.6348
Project Manager: Rachelle Arada

RECEIVING LABORATORY:

American Scientific Laboratories
2520 N. San Fernando Rd.
Los Angeles, CA 90065
Phone :(323) 223-9700
Fax: (323) 223-9500
PO#: SC07476 Standard TAT *(RX)*

IMPORTANT : Please include Work Order # and PO # in your invoice.

Analysis	Due	Expires	Lab. ID.	Sampled
ATL Lab#: 1203111-01 / E-121A-GW 405.1_5210B	09/18/12 17:00	09/06/12 11:00	287838	Water 09/04/12 11:00

Comments:

[Handwritten signatures and initials]

Released By

Date

Received By

9-5-12 15:10

Released By

Date

Received By

Date

September 13, 2012

Advanced Technology Laboratories
ATTN: Rachelle Arada
3275 Walnut Ave.
Signal Hill, CA 90755



LA Cert 04140
EPA Methods TO3, TO14A, TO15, 25C/3C,
RSK-175
TX Cert T104704450-09-TX
EPA Methods TO14A, TO15

LABORATORY TEST RESULTS

Project Reference: 1203111
Lab Number: D090502-01

Enclosed are results for sample(s) received 9/05/12 by Air Technology Laboratories. Analyses were performed according to specifications on the chain of custody provided with the sample(s).

Report Narrative:

- Unless otherwise noted in the report, sample analyses were performed within method performance criteria and meet all requirements of the NELAC Standards.
- The enclosed results relate only to the sample(s).

ATL appreciates the opportunity to provide testing services to your company. If you have any questions regarding these results, please call me at (626) 964-4032.

Sincerely,



Mark Johnson
Operations Manager
MJohnson@AirTechLabs.com

Enclosures

Note: The cover letter is an integral part of this analytical report.

Client: Advanced Technology Laboratories
Attn: Rachelle Arada
Project Name: NA
Project No.: 1203111
Date Received: 09/05/12
Matrix: Air
Reporting Units: ppmv

Page 2 of 3
D090502

EPA 15/16

Lab No.:	D090502-01						
Client Sample I.D.:	1203111-03 / E-121A-Air						
Date Sampled:	09/04/12						
Date Analyzed:	09/06/12						
QC Batch No.:	120906GC3A1						
Analyst Initials:	VM						
Dilution Factor:	1.0						
ANALYTE	Result ppmv	RL ppmv					
Hydrogen Sulfide	ND	0.20					

ND = Not Detected (below RL)

RL = Reporting Limit

Reviewed/Approved By: _____
Mark Johnson
Operations Manager

Date 9/12/12

The cover letter is an integral part of this analytical report



Air TECHNOLOGY Laboratories, Inc.

18501 E. Gale Avenue, Suite 130 ♦ City of Industry, CA 91748 ♦ Ph: (626) 964-4032 ♦ Fx: (626) 964-5832

Figure F-1.155

QC Batch No.: 120906GC3A1
Matrix: Air
Units: ppmv

Page 3 of 3
D090502

QC for Sulfur Compounds by ASTM D5504

Lab No.:	Method Blank	LCS	LCSD	
Date Analyzed:	09/06/12	09/06/12	09/06/12	
Analyst Initials:	VM	VM	VM	
Datafile:	06SEP003	06SEP001	06SEP002	
Dilution Factor:	1.0	1.0	1.0	
ANALYTE	Results	RL	% Rec.	Criteria
Hydrogen Sulfide	ND	0.20	101	70-130%
			101	70-130%
			0.4	<30

ND = Not Detected (Below RL)

RL = Reporting Limit

Reviewed/Approved By:


Mark J. Johnson
Operations Manager

Date: 9/1/12

The cover letter is an integral part of this analytical report.



AirTECHNOLOGY Laboratories, Inc.

18501 E. Gale Avenue, Suite 130 ♦ City of Industry, CA 91748 ♦ Ph: (626) 964-4032 ♦ Fx: (626) 964-5832

Figure F-1.156

D090502-01

**ADVANCED  TECHNOLOGY
LABORATORIES**

SUBCONTRACT ORDER

Work Order: 1203111

SENDING LABORATORY:

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
Phone: 562.989.4045
Fax: 562.989.6348
Project Manager: Rachelle Arada

RECEIVING LABORATORY:

Air Technology Laboratories
18501 E. Gale Ave, Suite 130
City of Industry, CA 91748
Phone :(626) 964-4032
Fax: (626) 964-5832
PO#: SC07474 Standard TAT (RA)

IMPORTANT : Please include Work Order # and PO # in your invoice.

Analysis	Due	Expires	Sampled	Comments
ATL Lab#: 1203111-03 / E-121A-Air 15_16_H2S_T	09/11/12 17:00	09/07/12 11:20	Air	09/04/12 11:20

Released By

Date

Received By

Date

Released By

Date

Received By

Date

CHAIN OF CUSTODY RECORD

TAT starts 8 a.m. following day if samples received after 5 p.m.

1

Preservatives:
H=HCl N=NOC
ROUTE
7 Workdays

DISTRIBUTION: White with red **V** Yellow to folder **B** Blue to substation **J** Jar **P** Print **C** Critical **E** Emergency **N** Next workday **D** Urgent **G** Glass **F** Fibre

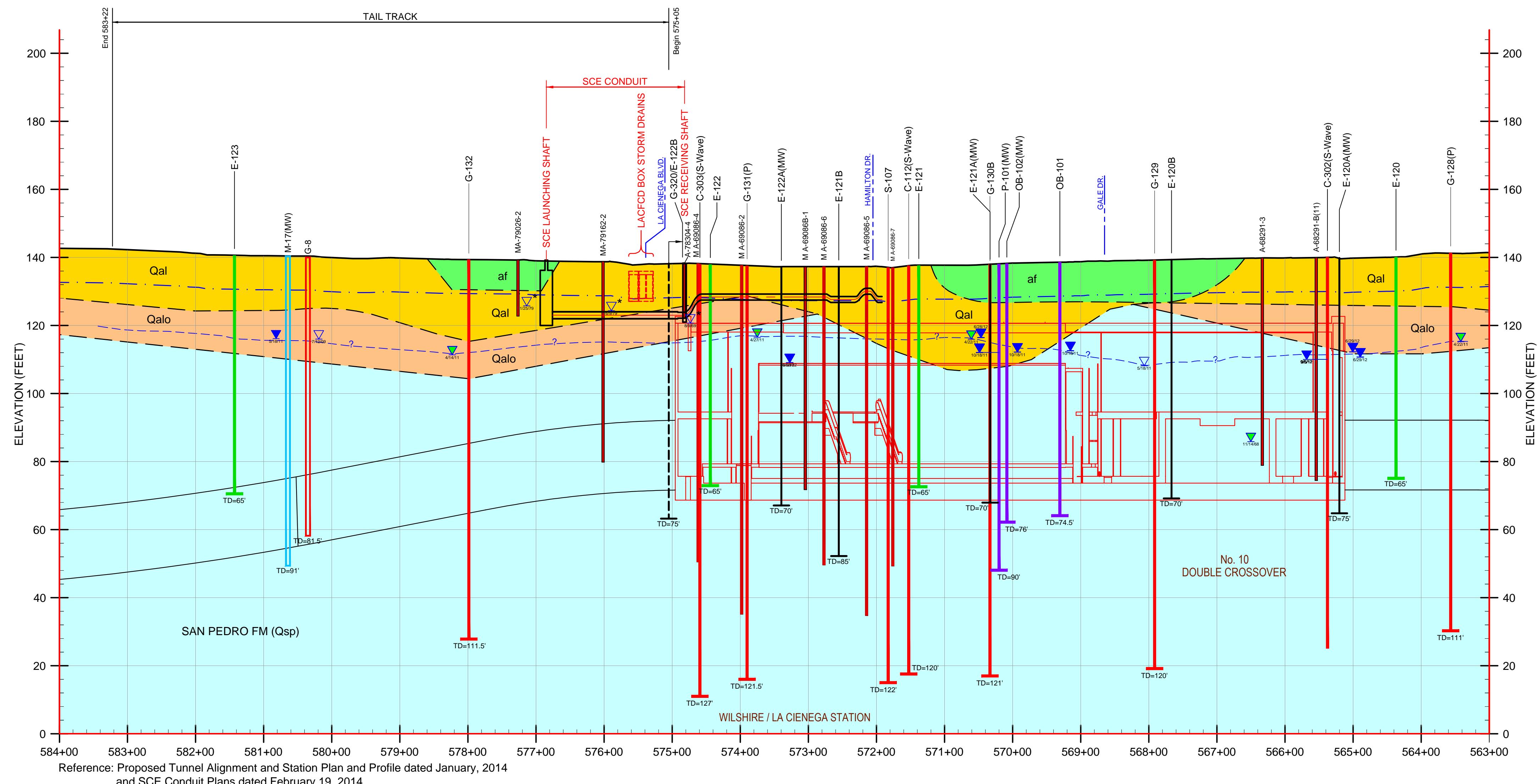
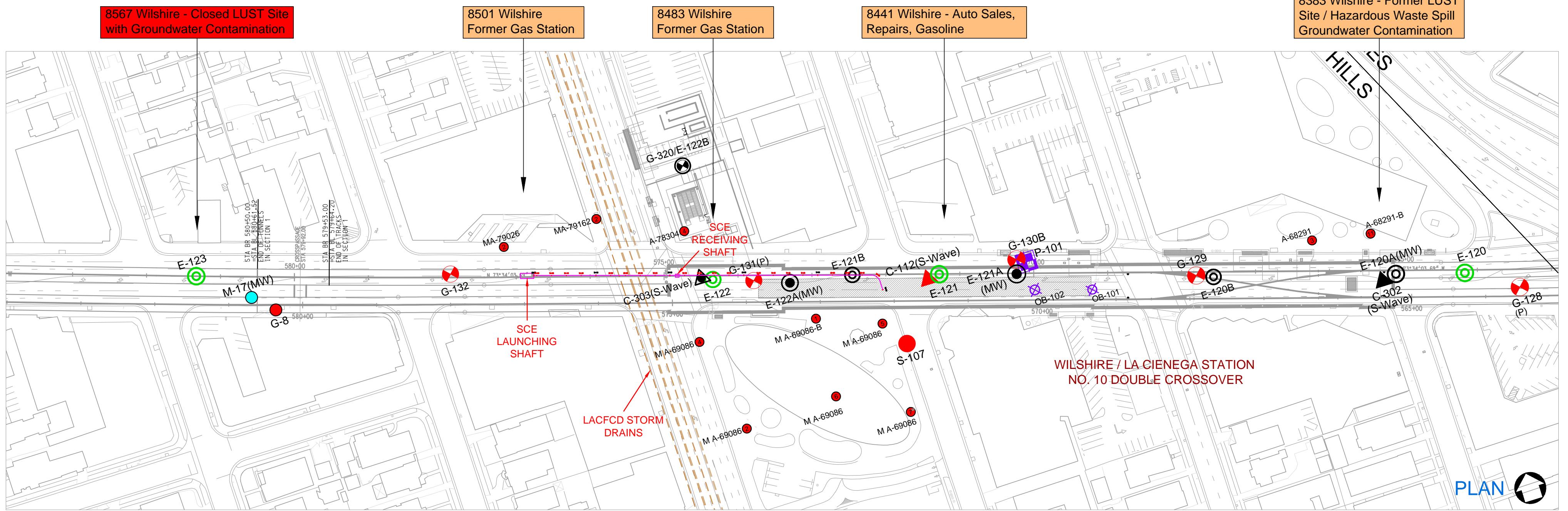
Figure F-1.158

PHASE III ENVIRONMENTAL INVESTIGATION WORK PLAN
WELL DEVELOPMENT AND SAMPLING

Groundwater Sample Analysis Contract List

Analytes	Method
dissolved methane	RSKSOP-175
Total sulfide and dissolved hydrogen sulfide	SM-4500-S=D
sulfate, chloride, nitrate	EPA 300.0
total dissolved solids	SM 2540C
total suspended solids	SM 2540D
pH	EPA 9040
TLIC dissolved metals	Total metals
mercury, dissolved	+ mercury
TRPH	EPA 1664 SGT/HEM
TPH - DRO & ORO	EPA 8015M/3520C
TPH - gasoline	EPA 8015M/5030B
SVOCs by GC/MS	EPA 8270C/3520C
VOCs by GC/MS including BTEX	EPA 8260B/3050B
oil & grease	EPA 1664
alkalinity	SM 2320B
pesticides	EPA 8081
PCBs	EPA 8082
Trip blanks	EPA 8260

PLATES



PROFILE: H=100', V=20' VERTICAL EXAGGERATION = 5:1

REV	DATE	BY	APP	DESCRIPTION	DESIGNED BY	PJE / RM	DRAWN BY	VMN	CHECKED BY	WL / HP	IN CHARGE	MBH / PM	DATE	2/20/2014	PROJECT MANAGER	WESTSIDE SUBWAY EXTENSION ADVANCED PRELIMINARY ENGINEERING EXPLORATION PLAN AND PROFILE PROPOSED SCE CONDUIT	CONTRACT NO

EXPLANATION

Investigations for Adv. PE Phase:

- C-303 Geotechnical CPT with Soil Gas Probes
- G-312 Geotechnical Rotary-Wash / Hollow-Stem Auger Boring
- E-122A Environmental Exploration with Soil Gas Probes
- G-320/E-122B Proposed Dual Geotechnical Boring / Environmental Boring
- OB-102 Groundwater Observation Well for Hydrogeologic Study

Investigations for PE Phase:

- G-131 Geotechnical Rotary-Wash Boring
- C-112 Geotechnical CPT
- S-107 Geotechnical Sonic Core
- E-122 Environmental Boring [Direct Push]
- G-126/M-116 Dual Geotechnical Boring/ Gas Monitoring Well
- M-115 Gas Monitoring Well
- P-101 Pump Test
- CB-104 CPT [Geotechnical + Gas - BAT]

Investigations for Prior ACE Phase:

- M-16 AMEC Environmental Exploration
- G-8 AMEC Geotechnical Exploration

Prior Investigations:

- M 90192 AMEC Geotechnical Exploration
- P-48 AMEC Environmental Exploration (1992)
- CWDD (CEG) 21 CWDD Converse Ward Davis Dixon (1981)
- SV-6, RC-17 EnviroRail (1994, 1996)

Symbol Labels:

- (MW) Groundwater monitoring (observation) well
- (P) Boring with pressuremeter testing
- (S-Wave) Boring / CPT with shear wave velocity measurements

Symbols Legend:

- Site view of station. Alignment based on plans dated January, 2014
- Profile view of station (red) with tunnel outline (black) based on plans dated January, 2014
- Site view showing center of tracks (blue), tunnel outlines (magenta dash) with perpendicular lines for cross passage
- NO. 10 DOUBLE CROSSOVER
- Shallowest groundwater depth measured in an observation well and date of measurement
- Shallowest overnight groundwater depth measured in a boring
- Shallowest groundwater depth measured during drilling of a boring
- Water seepage during drilling
- Depth to recorded shallowest groundwater table
- Geologic contact line
- Historically recorded highest groundwater level (CDMG, 1998)

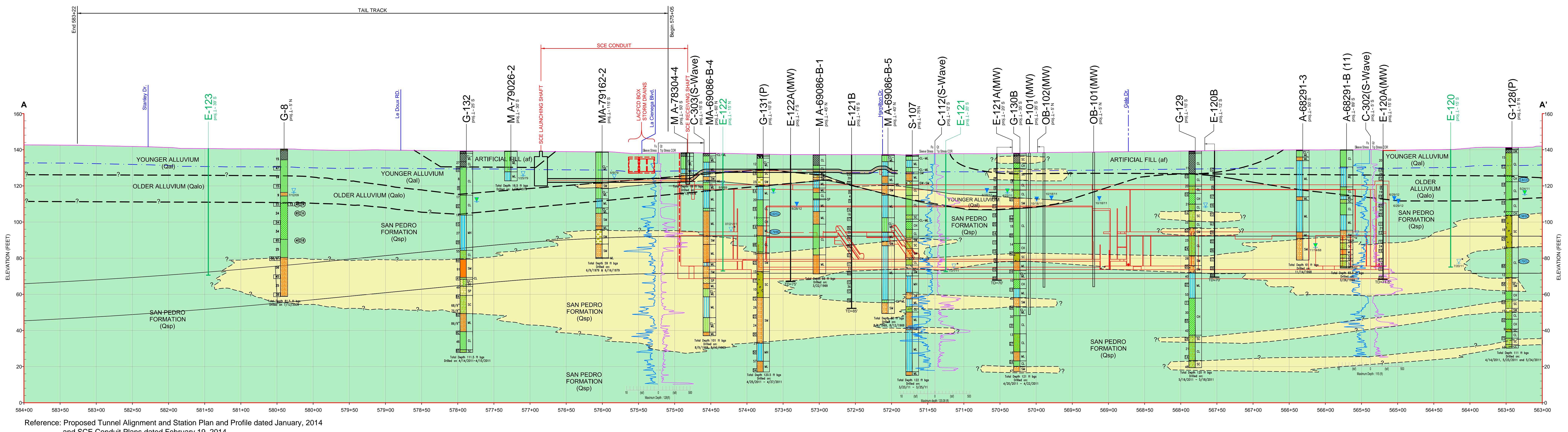
Geologic Units:

- af ARTIFICIAL FILL (undocumented)
- Qal YOUNGER ALLUVIUM (Holocene) - predominantly sand, silt and clay
- Qalo OLDER ALLUVIUM - varying layers of Silty Sand, Clayey/Silty Clay, and Silt with occasional gravel
- Qsp SAN PEDRO FORMATION (mid Pleistocene) - predominantly greenish gray and bluish gray fine-grained Sands, medium to coarse Sands and some Silt Layers
- URS Identified Potential Contamination Suspect Site
- AMEC Identified Potential Contamination Suspect Site
- AMEC / URS Identified Potential Contamination Suspect Site

CONTRACT NO
DRAWING NO
PLATE 1
REV

SCALE
AS NOTED

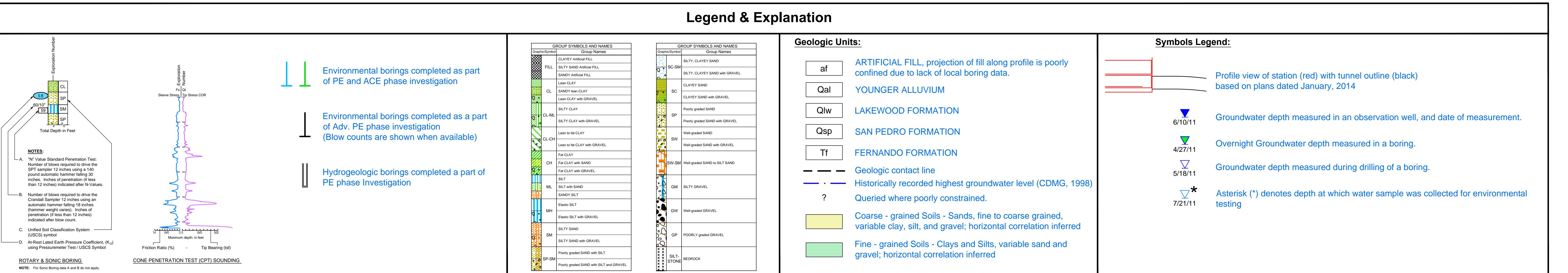
SHEET NO



Reference: Proposed Tunnel Alignment and Station Plan and Profile dated January, 2014
and SCE Conduit Plans dated February 19, 2014.

Notes:

1. Cross-sections are based on current and prior boring data.
2. Depth to fill may not reflect current conditions. Geologic and soil units are interpreted along section from explorations of different types, vintages, projected distances, and material descriptions.
3. Geologic contacts are based on current interpretation of subsurface data.
4. For clarity purposes, few of the prior geotechnical explorations are not shown on profile. Geologic units and contacts shown in profile are based on all the explorations shown on Plate 1



					DESIGNED BY P.
					DRAWN BY
					CHECKED BY V
					IN CHARGE ME
					DATE 2/
REV	DATE	BY	APP	DESCRIPTION	



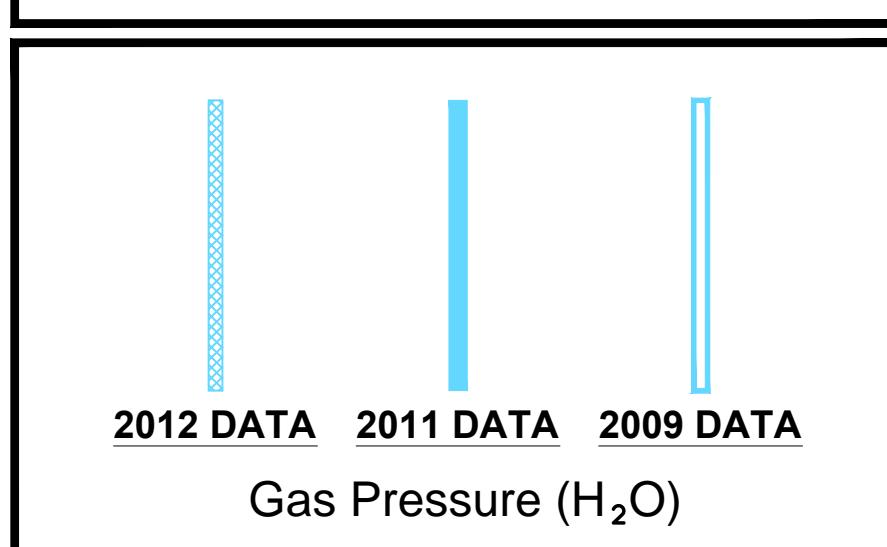
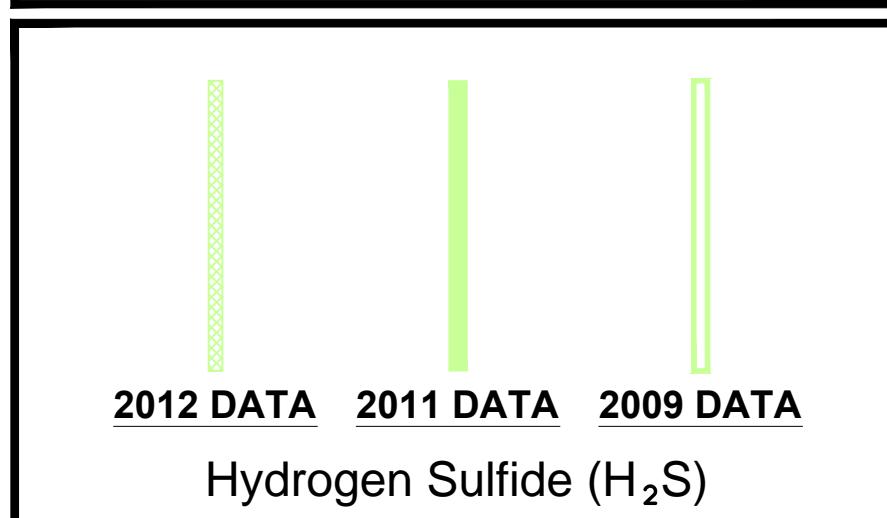
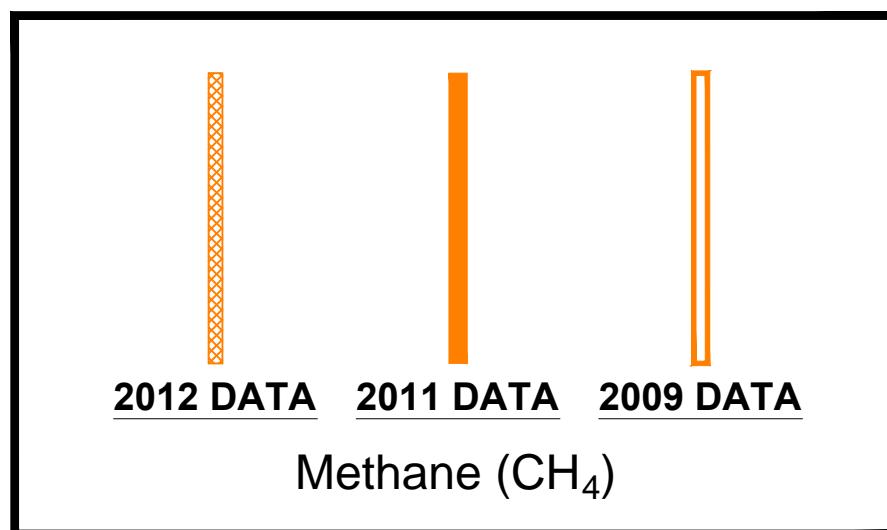
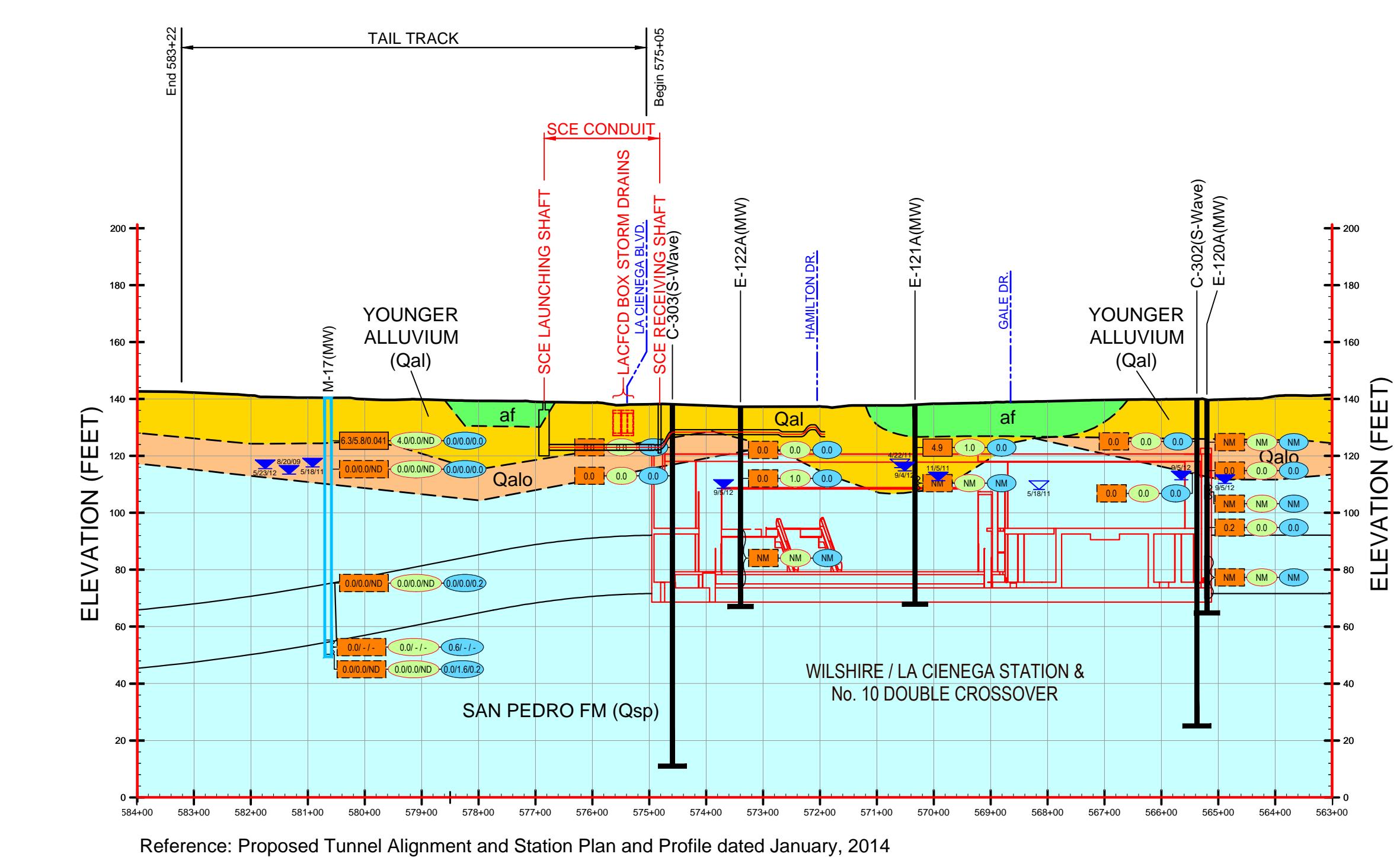
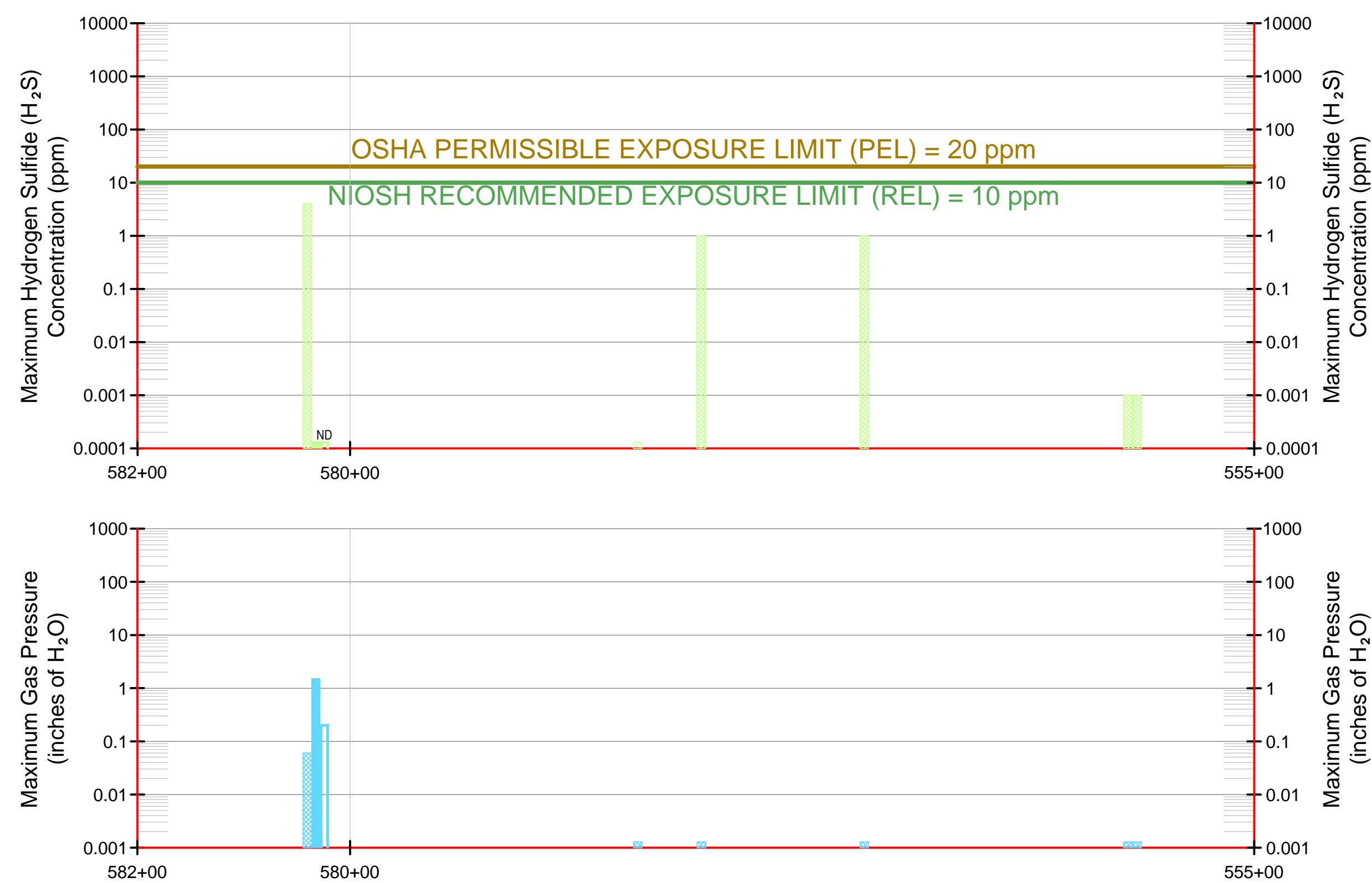
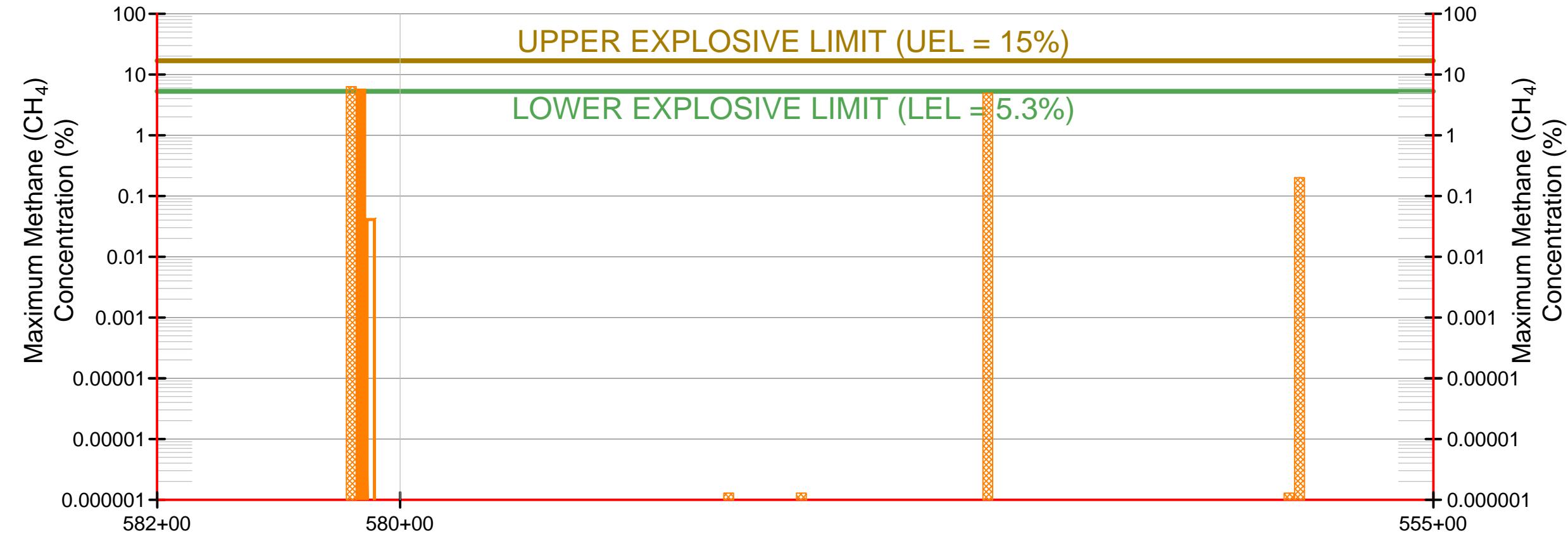
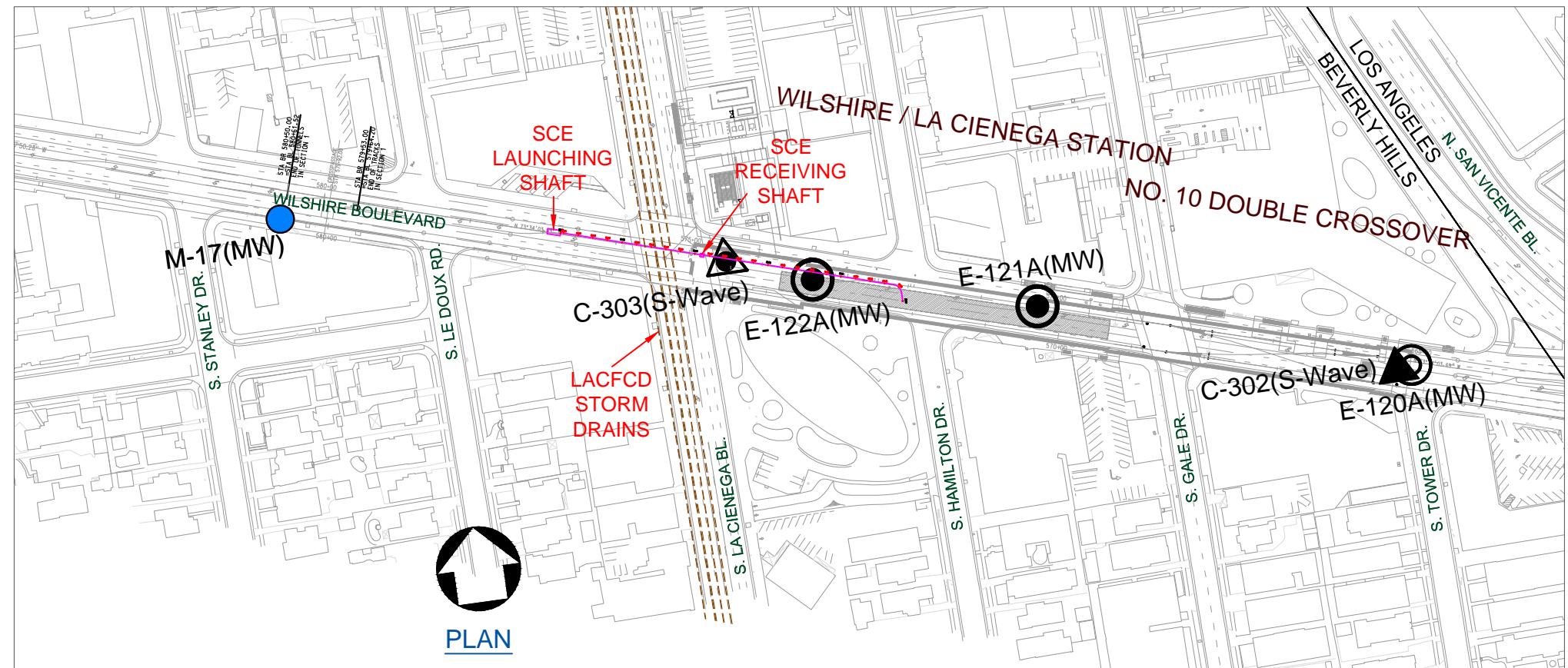
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

WESTSIDE SUBWAY EXTENSION ADVANCED PRELIMINARY ENGINEERING

GEOLOGIC CROSS SECTION (LONGITUDINAL) PROPOSED SCE CONDUIT CROSS SECTION A-A'

CONTRACT NO	
DRAWING NO	REV
PLATE 2	
SCALE	
As-Shown	
HEET NO	

EXPLANATION



M-17 ● Subsurface Gas / Groundwater Monitoring Well (ACE Phase)
E-122A ● Environmental Exploration with Soil Gas Probes
E-122A ○ Environmental Exploration (Adv. PE Phase)
C-302 ▲ Geotechnical CPT
C-303 ▲ Geotechnical CPT with Soil Gas Probes

GAS SYMBOLS

MAXIMUM RECORDED VALUES

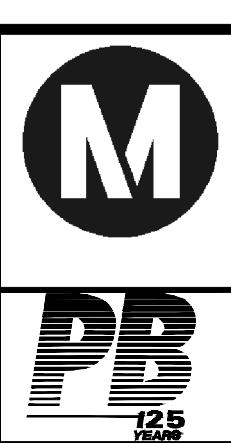
During 2009 to 2012

Methane (CH_4):
● <5% by Volume
● 5 - 25% by Volume
● 26 - 100% by Volume
Hydrogen Sulfide (H_2S):
● 0.7 ppm (Parts Per Million by Volume)
Pressure (H_2O):
● 0.7 inches of Water

NOTES:

1. Frequency of monitoring events in the ACE, PE, Adv. PE, and prior wells:
 - 1.a. For prior wells, 3 events (2012/2011/prior to 2011)
 - 1.b. For ACE phase wells, 3 events (2012/2011/2009)*
 - 1.c. For PE phase wells, 2 events (2012/2011)
 - 1.d. For Adv. PE phase wells, 1 event (2012)
2. Groundwater Level and date measured (AMEC 2009 - 2012)
3. The borings and wells indicated on this figure are part of the Soil-Gas Investigation Program. Additional borings (i.e. for geotechnical purposes) have been completed but are not shown on this figure
4. Interpretation of subsurface geology is based on both geotechnical and soil-gas / environmental boring
5. N.M. = Not measured

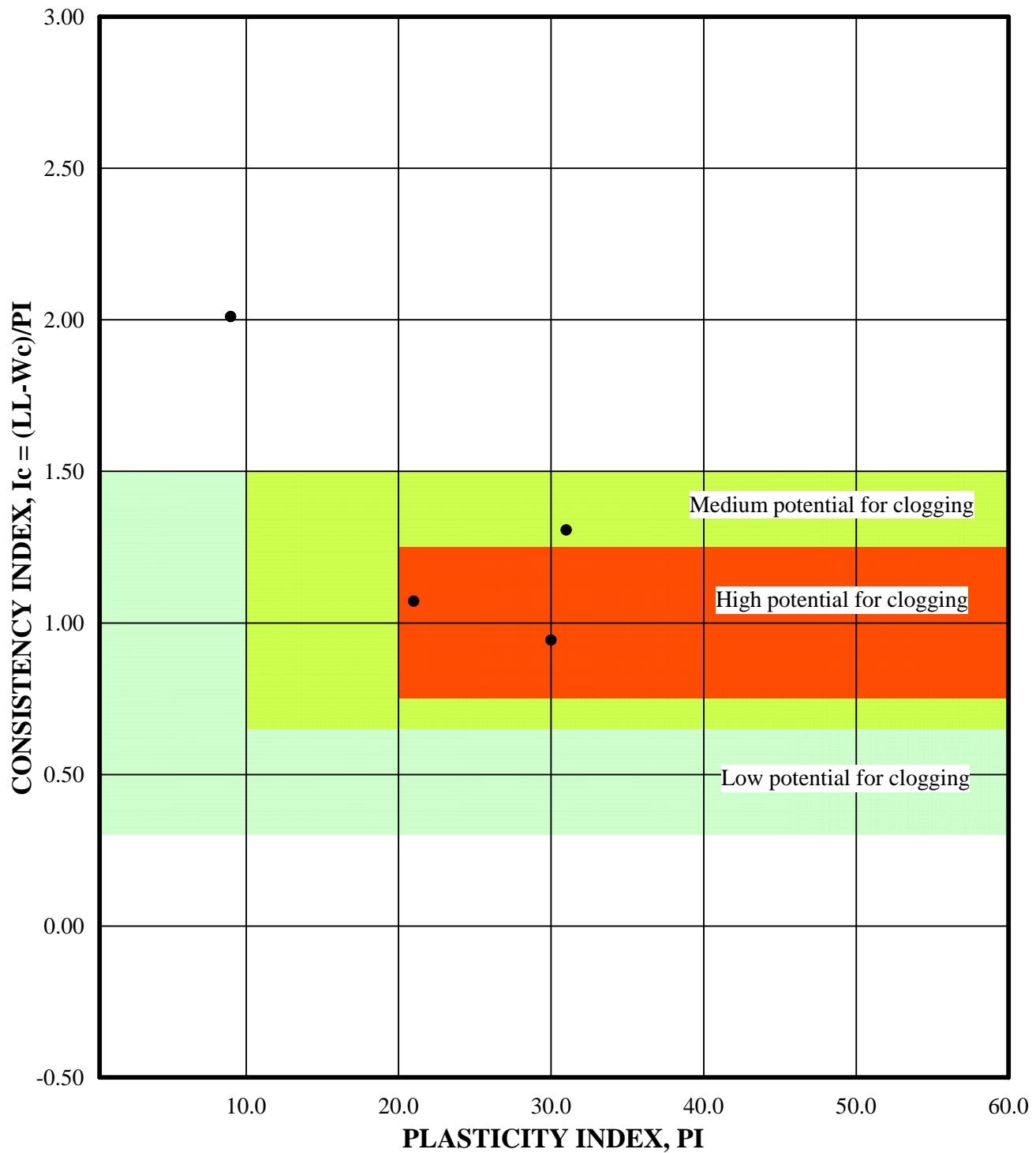
REV	DATE	BY	APP	DESCRIPTION	DESIGNED BY	PJE / RM	DRAWN BY	VMN	CHECKED BY	WL / HP	IN CHARGE	MBH / PM	DATE	PROJECT MANAGER	CONTRACT NO	DRAWING NO	PLATE 3	REV	SCALE	AS NOTED	SHEET NO



LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY



WESTSIDE SUBWAY EXTENSION
PRELIMINARY ENGINEERING
PLOT OF SUBSURFACE GAS DATA
PROPOSED SCE CONDUIT



Reference: *Clogging of TBM drives in clay*, M. Thewes and W. Burger, 2005

Prepared/Date: JF 2/17/2014
Checked/Date: LT 2/18/2014

MTA Westside Subway Extension
Los Angeles, California



Clogging Potential of Soils
Project No.: 4953-11-1423
Plate 4